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Ultrasound guided neurolytic phenol block of the obturator nerve in treating severe hip adductors spasticity of spine cord injured patients

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Abstract

Background: To assess the ultrasound guided neurolytic phenol block of the obturator nerve in treating severe hip adductors spasticity of spine cord injured patients.

Methods: A hospital based interventional study conduct on Spine cord injury patients with bilateral hip adductor spasticity of grade 3 as measured on Modified Ashworth Scale (MAS) attended in the department of Physical Medicine and Rehabilitation, SMS Hospital, Jaipur.

Results: Average number of pricks to block obturator nerve in terms of skin prick to reach up to obturator nerve which observed as adductor motor response at lowest stimulator current was 2.53 (1.0 to 6.0). Average time of the obturator nerve block in terms of disappearance of adductors motor response after phenol injection was 1.66 min (1.0 to 4.41min).

Conclusion: This study suggests that phenol block of the obturator nerve is effective in treating severe adductor spasticity. We recommend a larger study with more participants and longer follow up period to allow

further assessment of the efficacy of the phenol block of the obturator nerve in treating severe adductor spasticity.

Keywords: Obturator Nerve, Spasticity, Blocks.

Introduction

Spasticity is derived from the Greek word *spasticus*, which means "to pull." It is a component of upper motor neuron syndrome (UMN), which occurred in many neurological conditions including spinal cord injury (SCI), multiple sclerosis, stroke, traumatic brain injury, cerebral palsy, hypoxic brain injury and tumors etc.

Spasticity as defined by Lance[1] "a motor disorder that is characterized by a velocity dependent increase in tonic stretch reflexes (muscle tone) with exaggerated tendon jerks, resulting from hyper excitability of the stretch reflex, as one component of the upper motor neuron (UMN) syndrome".

A new definition of spasticity was given by Interdisciplinary Working Group Movement Disorders (IAB)[2] as "involuntary muscle hyperactivity in the presence of central paresis. Involuntary muscle hyperactivity consists of spasticity sensu strictu, dystonia, rigidity and spasms or mixture of those elements, pain and contractures may occur as complications." According to Barnes[3] sign of UMN may be divided into "negative" (weakness, reduced dexterity and fatigue) and "positive" signs (increased tendon reflexes with radiation of effect, spasticity, clonus, and extensor and flexor spasms).

Spasticity resists muscle stretch and lengthening that lead to two consequences one is contractures and secondly restricted attempted movements.

Therapeutic options for treatment of spasticity are pharmacological, physiotherapy, orthotics (splints, serial casting), intrathecal baclofen, surgical interventions (selective dorsal rhizotomy, longitudinal myelotomy, orthopaedic surgery) and chemodenervation either by botulinum toxin or phenol.

Pharmacological treatment for spasticity include oral anti-spasticity drugs which is used in diffuse or regional muscle spasticity rather than localized muscle spasticity, commonly used drugs are Baclofen, Benzodiazepine, Dantrolene sodium, clonidine and Tizanidine, these drugs can be used as monotherapy or in combination to reduce spasticity effectively.[4]

Range of motion exercise and stretching are done to minimize loss of joint range and maintaining soft tissue extensibility to prevent muscle contracture as part of physical modalities. To complement these traditional therapies [5,6] other treatment are available, such as Botulinum toxin for focal spasticity and nerve and neuromuscular junction block with phenol and alcohol either alone or in combination with Botulinum toxin.[7]

Chemical neurolysis of peripheral nerve with chemical substance such as phenol and alcohol have been shown to be effective intervention in the management of spasticity.[8] Phenol in most of the patients relieves muscle spasticity without significantly affecting strength of voluntary muscle contraction.[9,10] That's why they are preferred over oral anti-spasticity drugs which often cause systemic adverse effects and non selective in their action thus affecting spastic as well as non spastic muscles. This confers chemical neurolysis a major advantage over treatment with oral anti spasticity drugs.

Phenol is a nonselective neurolytic and neurolysis is proportional to the concentration and total volume of fluid used[11].Phenol exerts local anesthetic and neurolytic effect. Local effect is immediate and transient and short-term which is directly proportional to thickness of nerve fibers.[12]

Neurolytic properties of phenol is long-term and due to protein coagulation, which result in Wallerian degeneration of nerve.[13]

Material and Method

Study Area: Spine cord injury patients with bilateral hip adductor spasticity of grade 3 as measured on Modified Ashworth Scale (MAS) attended in the department of Physical Medicine and Rehabilitation, SMS Hospital, Jaipur.

Study Design: A hospital based interventional study.

Study Duration: From the approval of the Research Review Board till the desired sample size was obtained and their follow up completed (May 2018 to September 2019).

Inclusion Criteria

- Aged >18 years and any gender
- Those who were willing to accept and sign for a valid and informed written consent
- Grade 3 spasticity on Modified Ashworth Scale of the bilateral hip adductors from an upper motor neuron lesion (spine cord injury)

Exclusion Criteria

- Prior chemo-neurolysis or chemo-denervation to the hip adductors in the past 1 year
- Evidence of fixed joint contracture
- Patient with coagulation disorders
- Patient with allergy to phenol
- Non cooperative patients
- Patient on blood thinner drugs
- Severely ill patients
- Infection at proposed site of block

Statistical Analysis

- Statistical analysis was performed with the SPSS, version 21 for Windows statistical software package (SPSS inc., Chicago, IL, USA)
- Continuous data were summarized as mean and standard deviation. Difference in two means were analyzed using student's't'-test.
- Qualitative data were expressed in form of proportion, difference in proportions were analyzed using "Chi -Square" test.
- The level of significance was kept 95% for all statistical analysis.
- P value <0.05 was taken as significant.

Observation

Table 1: Distribution of the cases according to age group

Age group	No of subjects	
	No	%
≤20	4	13.33
21 to 30	11	36.67
31 to 40	7	23.33
41 to 50	4	13.33
51 to 60	1	3.33
>60	3	10
Total	30	100.00

Maximum numbers of block were performed in age group of 21 to 30 years 11 (36.67%), followed by 41 to 50 years 7 (23.33%) and only 1 (3.33%) blocks were performed in age group 51 to 60 years.

Table 2: Distribution of the cases according to gender

Gender	No of subjects	
	No	%
Female	5	16.67
Male	25	83.33
Total	30	100.00

Maximum numbers of obturator nerve block were performed in males 25 (83.33%) and 5 (16.67%) blocks were performed in females.

Table 3: Distribution of the cases according to vertebral injury

Vertebral Injury	No of subjects	
	No	%
Cervical	4	13.333
Dorsal	16	53.333
Lumbar	0	0.000
Multiple region	3	10.000
No bony injury	7	23.333
Total	30	100.000

Maximum numbers of block were performed in dorsal region 16 (53.33%) of vertebral injury patients followed by cervical, multiple vertebral region and no bony injury patients 4(13.33%), 3 (10.00%) and 7 (23.33%) respectively.

Table 4: Distribution of the cases according to No. of prick

No of Prick	No of subjects	
	No	%
1	2	6.67
2	17	56.67
3	6	20.00
4	4	13.33
5	0	0.00
6	1	3.33
Total	30	100.00

In this study, 17 (56.67%) obturator nerve were blocked by 2 pricks, while 6 (20%) obturator nerve were blocked by 3 pricks, followed by 2 (6.67%) were blocked by 1 prick, 4 (13.33%) by 4 pricks and only 1 (3.33%) obturator nerve was blocked by 6 pricks.

Table 5: Distribution of the cases according to decrease in spasticity score (MAS Score) at one month

MAS Score at one month	No of subjects	
	No	%
1	14	46.67
1+	15	50.00
2	1	3.33
3	0	0
4	0	0
Total	30	100.00

All 30 sites were in grade 3 hip adductors spasticity at baseline but after one month score was decrease out of 30 site, most of the cases were observed in grade 1+ hip adductors spasticity 15 (50.00%) followed by grade 1 hip adductors spasticity 14 (46.67%) than only 1 (3.33%) sites were in grade 2 hip adductors spasticity as measured on MAS score in our study.

Table 6: Procedure time

	N	Mean	Std. Deviation	Minimum	Maximum
No of prick	30	2.53	1.042	1	6
Duration of procedure	30	1.6630	.74215	1.00	4.41

Average number of pricks to block obturator nerve in terms of skin prick to reach up to obturator nerve which observed as adductor motor response at lowest stimulator current was 2.53 (1.0 to 6.0). Average time of the obturator nerve block in terms of disappearance of adductors motor response after phenol injection was 1.66 min (1.0 to 4.41min).

Discussion

One of the most important consequences of upper motor neuron syndrome is spasticity which is "involuntary muscle hyperactivity in the presence of central paresis".[2] Adductor muscle spasticity may occur

in many neurological conditions like multiple sclerosis, spinal cord injury, traumatic brain injury and cerebral palsy. Spasticity increases in these patients due to various inadequate trigger like pain, tight clothing and during perineum hygiene and interfere in activity of daily living and ambulation.

Primary aim of medical intervention is to decrease spasticity either by oral drugs (baclofen, tizanidine, clonidine, etc.), intrathecal baclofen pump neurolytic applications or by surgical interventions like rhizotomy and myelotomy.

Peripheral nerve blocks with phenol/alcohol have been shown to decrease spasticity by interrupting the uninhibited reflex arc. Neurolysis of obturator nerve is frequently used for hip adductor spasticity.[11]

Here are a limited number of reports concerning the cases treated with ON neurolysis. Akkaya et al. performed ON block using phenol in patients with severe hip adductor spasticity. Hey reported that the decrease in spasticity lasted for about 3 months [14]. One of the main reasons for the use of phenol neurolysis falling out of favour in the past 1-2 decades was the concern of developing dysesthesias in the distribution of the treated nerve. However, the obturator nerve has very little in the way of cutaneous sensory distribution, thus some clinicians throughout the world still routinely use phenol for neurolysis of the obturator nerve to relieve adductor spasticity [15,16] None of the participants in this study reported dysesthesias. His could be due to the participant's baseline reduced sensation in the lower extremities or the obturator nerve's small cutaneous sensory distribution.

Conclusion

This study suggests that phenol block of the obturator nerve is effective in treating severe adductor spasticity. We recommend a larger study with more participants and longer follow up period to allow further assessment of the efficacy of the phenol block of the obturator nerve in treating severe adductor spasticity.

References

1. Lance JW. Symposium synopsis. In: Feldman FG, Young RR, Koella WPs, eds. Spasticity: Disorder of Motor Control. Chicago, Ill: Year Book Medical; 1980:485-94.
2. IAB- Interdisciplinary Working Group for Movement Disorders, Hamburg, Germany
3. Barnes MP (2008) An overview of the clinical management of spasticity. In: Barnes MP, Johnson GR (eds) Upper Neurone syndrome and spasticity: clinical management and neurophysiology, 2nd edn. Cambridge University Press, Cambridge, pp 1–8
4. Pharmacological management of spasticity: 7; UMN Syndrome and Spasticity; Second Edition: Cambridge University press; 2008: 131-144.
5. Das, T.K. & Park, D.M (1989). Botulinum toxin in the treatment of spasticity. Br J Pharmacol, 87: 1044-9.
6. Penn, R.D., Savoy, S.M.& Corcos, D. (1984). Intrathecal baclofen alleviates spinal cord spasticity. Lancet, 1:1078.
7. Liversedge, L.A. (1960). Use of phenol in the relief of spasticity. BMJ, 242:31-3.
8. Chemical neurolysis in the management of muscle spasticity: 8, UMN Syndrome and Spasticity; Second Edition: Cambridge University press; 2008: 150-163.
9. Brown, A.S. (1958). Treatment of intractable pain by subarachnoid injection of carbolic acid. Lancet, 2: 975-8.

10. Khalili, A.A. & Betts, H.B. (1967). Peripheral nerve block with phenol in the management of spasticity. JAMA, 200: 1155-7.
11. Akkaya T, Unlu E, Alptekin A, Gumus HI, Umay E et al. (2010) Neurolytic phenol blockade of the obturator nerve for severe adductor spasticity. Acta Anaesthesiol Scand 54: 79-85.
12. Braun, R.M., Hoffer, M.M., Mooney, V., McKeever, J.&Roper, B. (1973). Phenol nerve block in the treatment of acquired spastic hemiplegia in the upper limbs. J Bone Joint Surg, 55A: 580-5.
13. Nathan, P.W., Sears, T.A. & Smith, M.C. (1965). Effects of phenol solution on the nerve roots of the cat: an electrophysiological and histological study. J Neuro Sci, 2: 7-29.
14. Akkaya T, Unlu E, Alptekin A, Gumus HI, Umay E, et al. (2010) Neurolytic phenol blockade of the obturator nerve for severe adductor spasticity. Acta Anaesthesiol Scand 54: 79-85.
15. YaÅŸar E, Tok F, TaÅŸkaynatan MA, Yilmaz B, Balaban B, et al. (2010) He e¡ects of phenol neurolysis of the obturator nerve on the distribution of buttock-seat interface pressure in spinal cord injury patients with hip adductor spasticity. Spinal Cord 48: 828-831.
16. Simpson DM, Gracies JM, Yablon SA, Barbano R, Brashear A (2009) Botulinum neurotoxin versus tizanidine in upper limb spasticity: a placebo-controlled study. J Neurol Neurosurg Psychiatry 80: 380-385.