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Original Research Article

Distal Sodium Channel Blocker: A New Modality in Identifying Spinal Pathology

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Abstract:

Background & Method: The aim of the study is to evaluate distal sodium channel blocker, a new modality in identifying spinal pathology. Patients were assessed by routine history taking and examination to rule out other local causes of pain, neurological deficits, allergies, etc. Patients were asked to localize the pain and once the nerve was found to be tender and painful on palpation, the pain physician injected local anesthetic (lignocaine 2%) around it and distal to identified painful area and we noted its effect on the pain within 15-30 minutes. Relief of pain distribution was noted as well.

Result: The average VAS score Pre injection was 7.94 which came significantly down to a value of 5.09 at 15 minutes and 1.39 at 30 minutes

Conclusion: Sodium channel blockers not only relief pain but also help in determining the site of pain generation by tracing the afferent pathways through pain relief. These are simpler and newer modalities which confer promising future and have a scope of replacing current diagnostic tools such as MRI, etc. in the field of pain management.

Keywords: Distal Sodium Channel, Spinal & Pathology.

Study Designed: Observational hospital based study.

Introduction

Pain is one of the major debilitating symptoms amongst patients these days. It is the voltage gated sodium channels that play an important role in mediating these nociceptive signals. Nerve injury triggers changes in their distribution, expression and biophysical properties, leading to aberrant excitability of these sodium channels. [1]

The nociceptors have a unique property of being pseudounipolar, which helps us explore the effect of sodium channel blockers, which when given in appropriate doses distal to the point of maximum tenderness along the course of a nerve, provide pain relief proximally upto the site of pain generation. This not only provides benefit to the patient but also aids in identifying the site of pain generation.
In this study. I observed the degree of pain relief in patients through VAS score after administration of a sodium channel blocker (2% lignocaine) by the pain specialist. The injection may give relief of pain of variable duration and confirms origin of pain, by relieving it. [2,3]

Primary Objectives

- To assess the pain relief in patients after sodium channel blocker administration.
- To see if the level of pain generation can be diagnosed by the use of sodium channel blockers.

Material & Method

This prospective, observational study was conducted after approval of institutional Ethics Committee of our hospital. We included all the patients suffering from back pain or leg pain radiating from back. All the patients were taught how to define pain using the visual analogue scale (VAS).

Patients were assessed by routine history taking and examination to rule out other local causes of pain, neurological deficits, allergies, etc. Patients were asked to localize the pain and once the nerve was found to be tender and painful on palpation, the pain physician injected local anesthetic (lignocaine 2%) around it and distal to identified painful area and we noted its effect on the pain within 15-30

minutes. Relief of pain distribution was noted as well.

Inclusion Criteria

- Patients suffering from back pain and leg pain
- Age group-18-70 years of age

Exclusion Criteria

- Patients' refusal
- Patient with neurological deficit

Results

Table 1: VAS score at 15 mins

Age group	Mean VAS (Pre-injection)	Mean VAS at 15 mins	% Reduction
18-30	7.71	4.85	37.09
31-45	7.38	4.46	39.56
46-60	8.33	4.58	45.01
61-70	8.37	6.5	22.34

On applying paired t test we got the t statistic of 7.409 which was significantly more than the t critical value of 3.182. Also, p value is 0.005 which is way less than alpha and hence the results are statistically significant.

Table 2: VAS score at 30 mins

Age group	Mean VAS (Pre-injection)	Mean VAS at 30 mins	% Reduction
18-30	7.71	0.85	81.97
31-45	7.38	1.38	81.30
46-60	8.33	1.08	90.28
61-70	8.37	2.25	73.11

On applying paired t test we got the t statistic of 21.926 which was significantly more than the t critical value of 3.182. Also, p value is 0.002 which is way less than alpha and hence the results are statistically significant

Table 3: Descriptive Stats (N=60)

	Min	Max	Mean	SD
PR	66	96	78.1	5.1
DBP	60	90	73.9	9.3
SBP	106	134	123.8	7.1
SPO2	0.02	0.99	0.8	1.1
RR	14	16	15.3	2.6

The chi-square statistic is 47.8139. The *p*-value is .049881. The result is significant at $p < .05$.

All 60 patients showed significant improvement post injection. There VAS score decreased tremendously. The injection not only relieved them from pain but also enabled them in acquiring limb mobility. The average VAS score of patients before the injection was 7.94 which came significantly down to a value of 5.09 after 15 minutes and 1.39 after 30 minutes of injection of sodium channel blockers.

Discussion

The propagation of nociceptive signals is done by voltage gated sodium channels which are selectively increased in damaged nerves and dorsal root ganglia neurons. The firing from these channels causes pain perception. Sodium channel blockers when given in appropriate doses and at correct site reduce this ectopic firing without causing any impact on normal nerve conduction [4].

The block induced by the sodium channel blockers helps to determine the pathophysiology of clinical pain, pathways of afferent signals and inflammatory site. It also helps in detecting the pain generator. [5,6] Relief from pain and positive results on injections of sodium channel blocker clearly point to the fact that the mechanism of pain generation is the upregulated sodium channels in nerve. [7,8]

Similar results have also been established in a study conducted by Satishchandra Gore et all where 90 symptomatic patients were included who had pain along the L5 and S1 dermataomes with an average VAS score of 7. An injection of lignocaine was delivered to all pain points. At 30 minutes post treatment only 3 out all the patients reported a VAS score of greater than 0.

Conclusion

Sodium channel blockers not only relief pain but also help in determining the site of pain generation by tracing the afferent pathways through pain relief. These are simpler and newer modalities which confer promising future and have a scope of replacing current diagnostic tools such as MRI, etc in the field of pain management.

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