

## Case Report

# Use of 10,000-Fold Effect by a Nitric Oxide Donor (Sodium Nitroprusside) in Motor Neuron Disease via Intrathecal Super Fusion

Vinod Kumar Tewari\*, Abhishek Gupta, Devesh Johari and Lori Tewari

Department of Neurosurgery, Advance Neuro and General Hospital, Uttar Pradesh, India

\*Correspondence: Vinod Kumar Tewari, Department of Neurosurgery, Advance Neuro and General Hospital, Uttar Pradesh, India

## Abstract

Motor Neuron Disease (MND) or Amyotrophic lateral sclerosis (ALS) is a slow fatal neurodegenerative disease characterized by selective and gradual motor neuronal death with unknown aetiology. The insufficient clearance of glutamate through the glutamate transporter, and the specific distribution of  $\text{Ca}^{2+}$ -permeable AMPA receptors in spinal motor neurons, indicates that glutamate-induced neurotoxicity is involved in its pathogenesis. NO is generated by nitric oxide synthase (NOS) which acts via 10000-fold effect to reverse the neuronal death. NO is destructive within 5 to 7 days as noted in earlier study by various authors. We have used intrathecal sodium nitroprusside to activate the 10000-fold effect to modulate the retrograde neuroregulation in MND.

**Keywords:** Motor neuron disease • 10000-fold effect • Intrathecal sodium nitroprusside

**Received date:** Apr 04, 2025; **Accepted date:** Apr 14, 2025; **Published date:** Apr 30, 2025

**Citation:** Tewari, Vinod Kumar, Gupta Abhishek, Johari Devesh and Tewari Lori. "Use of 10,000-Fold Effect by a Nitric Oxide Donor (Sodium Nitroprusside) in Motor Neuron Disease via Intrathecal Super Fusion. J Neu 4, 2.

**Copyright:** © 2025 Tewari, VK. All intellectual property rights, including copyrights, trademarks rights and database rights with respect to the information, texts, images, logos, photographs and illustrations on the website and with respect to the layout and design of the website are protected by intellectual property rights and belong to Publisher or entitled third parties. The reproduction or making available in any way or form of the contents of the website without prior written consent from Publisher is not allowed.

## INTRODUCTION

Nitric oxide donors, like Sodium nitroprusside, modulates the antegrade neurotransmission via retrograde neuroregulation by 10000-fold effect, is well established by the previous authors [1]. In motor neuron disease (MND) or Amyotrophic lateral sclerosis (ALS) the insufficient glutamate transport induced motor neuronal gradual death hypothesized by us that the 10000-fold effect would be one of the remedy in these dreadful conditions [2]. The SNP causes release of NOS and then NO which causes 10000-fold effect which modulates the ANT via RNT. Previous authors also postulated the negative effect of NO but those authors had skipped the fact that the SOD and nNOS remains active at synaptic cleft for just 5 to 7 days [3].

We have utilised this ITSNP to induce 10000-fold effect after 5th day of MND diagnosis and after skipping the effect of SOD and nNOS. To quantify the effect we have utilised AL-TENS (acupuncture like transepidermal neural stimulation) in pre ITSNP and post ITSNP phase [4].

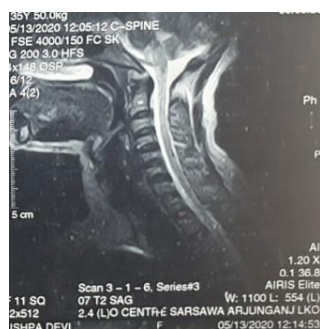
## CASE REPORT

A 42-year-old female presented in normal sensorium in OPD room on wheel chair bound condition with chief complaints of headache and JN| Volume 4|Issue 2|APR, 2025

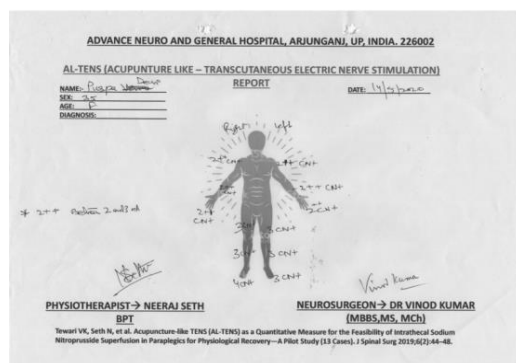
fever off since NOV 2019, severe headache since march 2020 with upper limbs and lower limbs on both side (right more weak as compared to left side) with nasal voice and difficulty of deglutination and sore throat. No history of corona contact, tuberculosis or diabetes. On examination she has full GCS E5V5M6 (GLASGOW COMA SCALE), cranial nerves examination revealed normal 3,4,5,6,7,8 nerve. 9th, 10th involved with nasal voice and loss of deglutination reflex. Motor examination showed right weaker as compared to left side. ASIA grading done in motor, sensory and bladder bowel involvement. Motor, normal nutrition of upper limbs and lower limbs both sides, tone increases on both sides below C5 myotomes, power 3/5 bilateral below C5 myotomes, grip 25% on right and 50% on left side. All Deep Tendon Reflexes were exaggerated below C5. Superficial reflexes absent below C5 and lower limb showing Clonus too. Sensory examination is showing 224/224 (all over body normal) without bladder bowel involvement. To secure airway we did tracheostomy as the lower cranial were involved and thus micro aspiration was one of the possibilities for chest infection.

MRI of brain stem done which showed some myelopathic changes in brain stem without any significant findings in rest of the cranial spinal axis (Figure 1).

AL-TENS has been done which showed 3 and 4 CN+ at left lower limbs pre ITSNP, 2 hrs post ITSNP 2 hrs, 3 post ITSNP 24 hrs, 4 post ITSNP 7 days, 5 post ITSNP 14 days (Figures 1-5).



**Figure 1.** MRI of brain stem.



**Figure 2.** Altens-14 = pre ITSNP, altens examination = shows the right upper and lower limbs are more affected, altens in right upper limb is at 2/10 all joints, right lower limbs 3/10 at left hip joint and knee joint and 4/10 left ankle joint, left upper limbs 2/10 all joints and left lower limbs 3/10 all joints.

ADVANCE NEURO AND GENERAL HOSPITAL, ARJUNGANI, UP, INDIA. 226002

AL-TENS (ACUPUNCTURE LIKE – TRANSCUTANEOUS ELECTRIC NERVE STIMULATION)

NAME: Pooja Datta  
SEX: F  
AGE: 24  
DIAGNOSIS:

REPORT  
DATE: 15/5/2024  
Physio 2nd ITSNP

PHYSIOTHERAPIST → NEERAJ SETH  
BPT

NEUROSURGEON → DR VINOD KUMAR  
(MBBS, MS, MCh)

Tewari VK, Seth N, et al. Acupuncture-like TENS (AL-TENS) as a Quantitative Measure for the Feasibility of Intrathecal Sodium Nitroprusside Superfusion in Paraplegics for Physiological Recovery—A Pilot Study (13 Cases). J Spinal Surg 2019;6(2):44-48.

**Figure 3.** Altens-24 = post ITSNP 2 hours, altens examination = shows the right upper and lower limbs are more affected, altens in right upper limb is at 2/10 all joints, right lower limbs 3/10 at all joints, left upper limbs 2/10 all joints and left lower limbs 3/10 all joints.

ADVANCE NEURO AND GENERAL HOSPITAL, ARJUNGANI, UP, INDIA. 226002

AL-TENS (ACUPUNCTURE LIKE – TRANSCUTANEOUS ELECTRIC NERVE STIMULATION)

NAME: Pooja Datta  
SEX: F  
AGE: 24  
DIAGNOSIS:

REPORT  
DATE: 16/5/2024  
Physio 3rd ITSNP

PHYSIOTHERAPIST → NEERAJ SETH  
BPT

NEUROSURGEON → DR VINOD KUMAR  
(MBBS, MS, MCh)

Tewari VK, Seth N, et al. Acupuncture-like TENS (AL-TENS) as a Quantitative Measure for the Feasibility of Intrathecal Sodium Nitroprusside Superfusion in Paraplegics for Physiological Recovery—A Pilot Study (13 Cases). J Spinal Surg 2019;6(2):44-48.

**Figure 4.** Altens-34 = post ITSNP 24 hours, altens examination = shows the right upper and lower limbs are more affected, altens in right upper limb is at 2/10 all joints, right lower limbs 3/10 at all joints, left upper limbs 2/10 all joints and left lower limbs 2/10 all joints.

ADVANCE NEURO AND GENERAL HOSPITAL, ARJUNGANI, UP, INDIA. 226002

AL-TENS (ACUPUNCTURE LIKE – TRANSCUTANEOUS ELECTRIC NERVE STIMULATION)

NAME: Pooja Datta  
SEX: F  
AGE: 24  
DIAGNOSIS:

REPORT  
DATE: 30/5/2024  
Physio 1st change ITSNP

PHYSIOTHERAPIST → NEERAJ SETH  
BPT

NEUROSURGEON → DR VINOD KUMAR  
(MBBS, MS, MCh)

Tewari VK, Seth N, et al. Acupuncture-like TENS (AL-TENS) as a Quantitative Measure for the Feasibility of Intrathecal Sodium Nitroprusside Superfusion in Paraplegics for Physiological Recovery—A Pilot Study (13 Cases). J Spinal Surg 2019;6(2):44-48.

**Figure 5.** Altens-54 = post ITSNP 14 days altens examination = shows the right upper and lower limbs are more affected, altens in right upper limb is at 2/10 all joints, right lower limbs 3/10 all joints, left upper limbs 2/10 all joints and left lower limbs 2/10 all joints.

After well informed consent and telling all untoward action (like sweating and apprehension) of ITSNP we superfused ITSNP about 15 ml of the SNP given of 50 mg of SNP dissolved in 200 ml of Dextrose 5% solution with full photoprotection and freshly prepared. Post ITSNP

AL-TENS done again after 2 hours, 24 hours, 7th day and 14th day and vedio recordings done also.

## DISCUSSION

The MND/ALS is a dreadful slow progressive disease. Mostly affects due to unknown aetiology but a proposed mechanism of MND/ALS pathophysiology is via insufficient glutamate transport induced motor neuronal gradual death [2]. The NOD releases NO which causes modulation of ANT via RNT by 10000-fold effect, thus increases the ANT impulses in those defective synaptic portions by bypassing the routine ANT impulses [1,3]

Reports showed no difference in the concentration of NO derivatives in the cerebrospinal fluid among several neurodegenerative diseases, including ALS and moreover, nNOS-knockout mice with mutant SOD1 transgene showed the same clinical onset and duration as nNOS-expressing mutant SOD1- transgenic mice [5,6].

To secure airway we did tracheostomy as the lower cranial were involved and thus micro aspiration was one of the possibilities for chest infection. Previous authors have proposed a negative remark in the use of NOD that the NO will produce a negative effect in MND/ALS [2]. But from our work it was well proved that the SOD level and nNOS level comes to normal after 5 to 7 days and if we skip this time the 10000-fold effect comes to action to generate the ANT via RNT [3].

## CONCLUSION

This case was well diagnosed as MND and after giving ITSNP to induce, the 10000-fold effect got 75% improvement on 15th day of post ITSNP phase.

## ACKNOWLEDGMENT

We are extremely thankful to Prof Dr H K Das Gupta Sir for giving us permission to use the Levodopa and Carbidopa combination on tetanus patients.

## REFERENCES

1. Tewari, Vinod Kumar, Husain Mazhar, and Gupta HK Das. "The 10,000-Fold- Effect-Retrograde Neurotransmission--A Newer Concept for Paraplegias Physiological Revival-Use of Intrathecal Sodium Nitroprusside." *J Evol Med Dent Sci* 3 (2014): 7270-7286.
2. Shimohama, Makoto Urushitani, Shun. "The Role of Nitric Oxide in Amyotrophic Lateral Sclerosis." *Amyot Later Scler Motor Neuron Disord* 2 (2001): 71-81.
3. Tewari, Vinod Kumar, Bhosale Vivek, Shukla Rakesh, and Gupta Hari Kishan Das. "Intracarotid Sodium Nitroprusside on Fifth Post Ischemic Stroke Day in Middle Cerebral Artery Occlusion Rat Model." *J Clin Diagn Res: JCDR* 11 (2017): AF01.
4. Tewari, Vinod K, Seth Neeraj, Johari Devesh, and Shukla Rakesh,et al. "Acupuncture-like TENS (AL-TENS) as a Quantitative Measure for the Feasibility of Intrathecal Sodium Nitroprusside Superfusion in Paraplegics for Physiological Recovery-A Pilot Study (13 Cases)." *J Spinal Surg* 6 (2019): 44.
5. Milstien, Sheldon, Sakai Naoki, Brew Bruce J, and Krieger Charles, et al. "Cerebrospinal Fluid Nitrite/nitrate Levels in Neurologic Diseases." *J Neurochem* 63 (1994): 1178-1180.
6. Facchinetti, F, Sasaki M, Cutting F B, and Macdonald J E et al. "Lack of Involvement of Neuronal Nitric Oxide Synthase in the Pathogenesis of a Transgenic Mouse Model of Familial Amyotrophic Lateral Sclerosis." *Neuroscience* 90 (1999): 1483-1492.