



ORIGINAL RESEARCH PAPER

Anaesthesiology

EFFECTIVENESS OF LUMBAR SYMPATHETIC BLOCK IN PATIENTS OF CHRONIC LEG PAIN PRESENTED TO PAIN CLINIC AT A TERTIARY GOVERNMENT HOSPITAL OVER PAST TWO-YEARS: A RETROSPECTIVE AND OBSERVATIONAL STUDY.

KEY WORDS: Lumbar sympathetic block, Rest pain, VAS Score, Claudication distance, CT-guided

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ABSTRACT

Background: Lumbar sympathetic block is used in inoperable peripheral vascular disease. The block acts as a vasodilator by decreasing sympathetic tone and improves tissue oxygenation and helps in ulcer healing. No guidelines exist till date for its use in patients with chronic leg pain and ulcers. The management of patients with unreconstructable distal disease with rest pain has always been difficult. Lumbar sympathetic block helps to abolish this rest pain.

Aims and Objectives:

1. To study the effectiveness of lumbar sympathetic block
2. To study the ideal level for needle insertion for 100% success rate.
3. To follow up the patients for 1 week, 4 weeks and 12 weeks for relief of symptoms.
4. To study the safety of the block and note the complications.

Materials and Methods: After approval of ethical committee, this retrospective study was conducted from Pain Clinic Records over the past two years. Total number of patients studied were 30 over past 2 years.

Data Collection: Demographic Data and VAS score was recorded

Preblock walking distance was recorded. CT guided lumbar sympathetic block was given.

Results and Conclusion: Lumbar sympathetic block was very useful, safe and effective method to decrease the rest pain in patients presented to pain OPD of our hospital. Follow up for 3 months showed healing of ulcers in some of these patients.

Background

Chronic leg pain is a common condition and has various etiological factors like peripheral vascular disease, diabetes mellitus and CRPS. No guidelines exist till date for use of lumbar sympathetic block in patients with chronic leg pain and ulcers. Lumbar sympathetic block is used principally in inoperable peripheral vascular disease¹. The block acts as a vasodilator by decreasing sympathetic tone and improves tissue oxygenation and helps in ulcer healing. It decreases pain by interrupting sympathetic nociceptive coupling and by a direct neurolytic action on nociceptive fibres².

The autonomic nervous system consists of the sympathetic and parasympathetic divisions³. As the name implies, the lumbar sympathetic block can be utilized to disrupt the nerve supply from the sympathetic chain to the lower extremities. Sympathetic denervation increases blood flow to a normal limb by abolishing basal and reflex constriction of the arterioles and precapillary sphincters. It alters distribution of blood flow by shunting cutaneous arteriovenous anastomoses. Increase of skin temperature is caused by increase of non-nutritive blood flow.

Peripheral vascular disease of the lower limbs is the most common vascular pathology⁵. The management of patients with unreconstructable distal disease with rest pain has always been difficult. Attempts to improve the quality of life by alleviating rest pain without limb ablation have led to the development of lumbar sympathectomy^{2, 5}. Lumbar sympathectomy acts as a vasodilator by decreasing sympathetic tone thereby improving tissue oxygenation. It also decreases pain by interrupting sympathetic nociceptive coupling and by a direct neurolytic action on nociceptive fibres¹.

Lumbar sympathetic block can be used for the treatment of painful conditions such as complex regional pain syndrome (CRPS), peripheral vascular disease (Reynaud's disease, Burger's disease).

Known complications of the block¹ are genitofemoral and femoral nerve neuralgia, retroperitoneal hematoma, ureteric injury and paraplegia secondary to inadvertent extradural injection.

Aims and objectives

1. To study the effectiveness of lumbar sympathetic block in terms of pain relief in post-procedure follow-up as assessed by visual analogue scale (VAS), relief of rest pain, claudication distance measurement, ulcer healing.
2. To study the ideal level for needle insertion for 100% success rate.
3. To follow-up the patients for 1 week, 4 weeks and 12 weeks for relief of symptoms.
4. To study the safety of the block and note the complications.

MATERIALS AND METHODS

This was a retrospective study conducted in a tertiary government hospital from western India. The data from electronic medical records (EMR) of patients undergoing lumbar sympathetic block in pain clinic over study period of two years was analyzed.

Total numbers of patients studied were 30 over the study period.

Due to rarity of occurrence of these cases and rarity of technique, the study included all the patients who fulfilled inclusion criteria over the study period after the consent for interventional procedure. After approval of The Institutional ethics committee,

INCLUSION CRITERIA:

- Patient with peripheral vascular disease.
- Patient of diabetes mellitus with chronic leg ulcer.
- Patient of CRPS having leg pain at rest.
- Patients with chronic non-healing ulcer with redness, shining, swelling and absence of dorsalis pedis artery in involved limb.

EXCLUSION CRITERIA

- Patient having grossly infected ulcer or gangrene.
- Patient with coagulopathy.
- Patient with seizure disorder.
- Patient with difficulty in prone positioning.
- Patient with known allergy to drugs.

All patients underwent full blood counts, coagulation profile,

urine examination, biochemistry, chest radiograph, electrocardiography (ECG), and doppler studies of lower limbs whenever indicated.

DATA COLLECTION :

| | |
|------------------------------------------------|--------------------------------|
| Data collected | : Year 2015 -2016 |
| Over study period 2 years: Year 2016 - 2017 | |
| From Pain OPD | : Year Jan.2017 till Aug. 2018 |
| Demographic Data | : Age 20 - 50 years. |

Sex : Male
H/o smoking recorded
VAS 9/10.

1. Baseline VAS score was recorded.
2. Preblock walking distance was recorded.

History, clinical examination of patients and symptoms and signs were recorded on a proforma.

RESULTS

Lumbar sympathetic block for chronic leg pain as an interventional pain management technique was very useful, safe and effective method to decrease the rest pain in patients presented to pain OPD of our hospital. Follow up for 3 months showed healing of ulcers in some of these patients.

Patients Lost for follow up :Nil
Single shot technique was used.
No patients required more than one block.

All the patients were followed in the pain OPD 1 week, 4 weeks and 12 weeks after the block (Table 11). Majority of the patients had improved VAS score and some patients were pain free without rest pain. The patients who presented to pain OPD with ulcer had healing of ulcer after the lumbar sympathetic block as evidenced in the follow up visits. The suggested mechanisms for improvement of rest pain are due to vasodilatory effects on collateral circulation.^{1,2,3} The increase in oxygenation leads to less tissue damage and hence, less pain. Interruption of painful routes maintained by sympathetic system and neurolytic direct effect on nociceptive fibers contribute to this effect and pain relief. Alcohol causes dehydration of neural tissue, resulting in sclerosis of nerve fibers and destruction of myelin.³ No complications were observed in our study (Table 10). The analgesic effect of the block was long lasting in the follow up up to 3 months.

Tables:

Table 1

Gender

| Gender | Number of patients | Percentage (%) |
|--------|--------------------|----------------|
| Male | 27 | 90.0 |
| Female | 3 | 10.0 |
| Total | 30 | 100.0 |

Table 2

Age

| Age group | Number of patients | Percentage (%) |
|-----------|--------------------|----------------|
| ≤ 40 | 8 | 26.68 |
| 41 - 50 | 11 | 36.67 |
| > 50 | 11 | 36.67 |
| Total | 22 | 100.00 |

Table 3

Pulse Rate

| Pulse rate at | Number of patients | Pulse rate | | p-value |
|-----------------|--------------------|------------|------|----------|
| | | Mean | SD | |
| Baseline | 30 | 87.40 | 5.73 | |
| Intra op 10 min | 30 | 89.07 | 6.05 | < 0.001* |
| 20 min | 30 | 89.00 | 5.98 | 0.001* |

| | | | | |
|-------------------|----|-------|------|-------|
| 30 min | 30 | 85.33 | 6.09 | 0.065 |
| Immediate post op | 30 | 88.18 | 5.59 | 0.135 |
| 5 min | 30 | 88.00 | 5.38 | 0.136 |
| 10 min | 30 | 87.86 | 5.52 | 0.218 |
| 15 min | 30 | 87.86 | 5.52 | 0.218 |

*Significant (p-value < 0.05) Paired t-test used

Table 4
Systolic Blood Pressure

| SBP at | Number of patients | SBP | | p-value |
|-------------------|--------------------|--------|------|---------|
| | | Mean | SD | |
| Baseline | 30 | 113.67 | 8.90 | |
| Intra op 10 min | 30 | 112.67 | 9.80 | 0.522 |
| 20 min | 30 | 114.20 | 8.18 | 0.713 |
| 30 min | 30 | 116.27 | 7.77 | 0.070 |
| Immediate post op | 30 | 114.55 | 7.39 | 0.747 |
| 5 min | 30 | 115.71 | 7.56 | 0.671 |

Not Significant (p-value > 0.05) Paired t-test used

Table 5
Diastolic Blood Pressure

| DBP at | Number of patients | DBP | | p-value |
|-------------------|--------------------|-------|------|---------|
| | | Mean | SD | |
| Baseline | 30 | 76.67 | 8.02 | |
| Intra op 10 min | 30 | 76.07 | 6.02 | 0.638 |
| 20 min | 30 | 76.80 | 5.77 | 0.913 |
| 30 min | 30 | 78.53 | 5.73 | 0.037 |
| Immediate post op | 30 | 77.27 | 6.31 | 0.576 |
| 5 min | 30 | 78.57 | 6.63 | 0.165 |
| 10 min | 30 | 78.57 | 6.64 | 0.167 |
| 15 min | 30 | 78.57 | 6.63 | 0.165 |

Not Significant (p-value > 0.05) Paired t-test used

Table 6

| Pulse rate at | Number of patients | SpO ₂ | | p-value |
|-------------------|--------------------|------------------|------|---------|
| | | Mean | SD | |
| Baseline | 30 | 99.50 | 0.51 | |
| Intra op 10 min | 30 | 99.53 | 0.57 | 0.813 |
| 20 min | 30 | 99.53 | 0.51 | 0.769 |
| 30 min | 30 | 99.53 | 0.51 | 0.769 |
| Immediate post op | 30 | 99.50 | 0.52 | 0.547 |
| 5 min | 30 | 99.50 | 0.52 | 0.547 |
| 10 min | 30 | 99.50 | 0.53 | 0.546 |
| 15 min | 30 | 99.50 | 0.52 | 0.547 |

Not Significant (p-value > 0.05) Paired t-test used

Table 7

Temperature

| | Number of patients | Temperature | | p-value |
|----------------|--------------------|-------------|-----|---------|
| | | Mean | SD | |
| Pre operative | 30 | 32.1 | 1.5 | 0.428 |
| Post operative | 30 | 32.7 | 5.3 | |

Not Significant (p-value > 0.05) Paired t-test used

Table 8

Claudication Distance

| | Number of patients | Claudication distance | | p-value |
|----------------|--------------------|-----------------------|------|----------|
| | | Mean | SD | |
| Pre operative | 22 | 20.8 | 15.0 | < 0.001* |
| Post operative | 22 | 30.7 | 14.7 | |

*Significant (p-value < 0.05) Paired t-test used

Table 9
Visual Analogue Scale

| VAS at | VAS | | | p-value |
|----------------|-----|-----|--------|---------|
| | Min | Max | Median | |
| Pre operative | 8 | 9 | 9 | < 0.001 |
| Post operative | 2 | 4 | 3 | |

-value < 0.05 (Significant) Wilcoxon sign rank test used

Table 10
Complications

| Serial number | Name of the complication | Yes/no |
|---------------|-----------------------------------|--------|
| 1 | Bleeding at the site | no |
| 2 | Bruising | no |
| 3 | Soreness | no |
| 4 | Swelling at the site of injection | No |

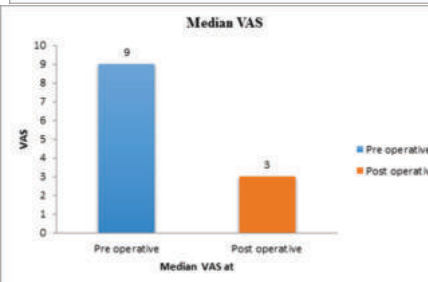
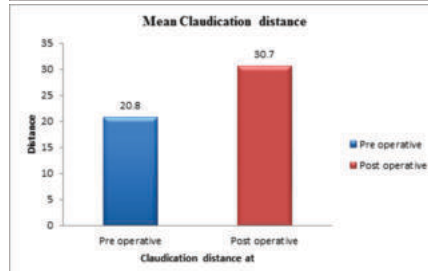
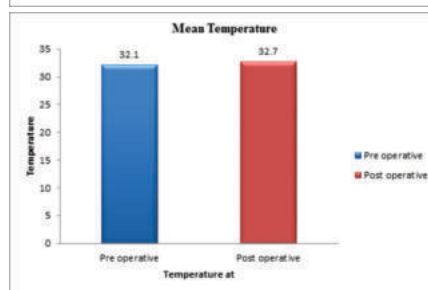
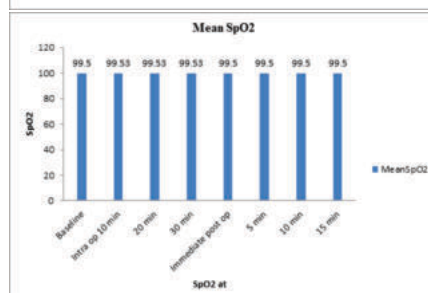
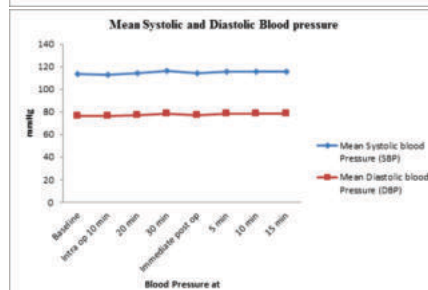
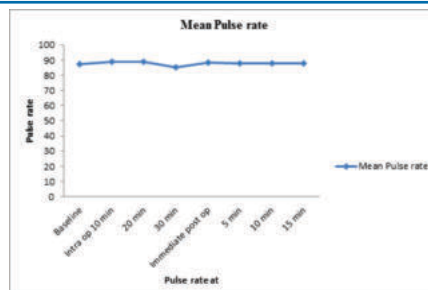
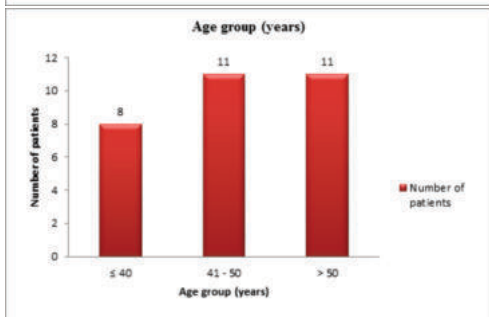
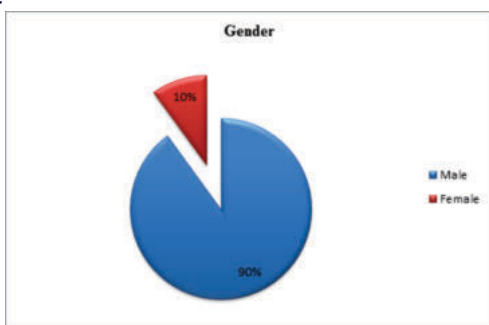
Table 11
VAS at the follow up visits

| Serial number | At 1 week post block | At 4 weeks post block | At 12 weeks post block |
|---------------|----------------------|-----------------------|------------------------|
| 1 | 5/10 | 2/10 | 2/10 |
| 2 | 6/10 | 2/10 | 2/10 |
| 3 | 4/10 | 1/10 | 1/10 |
| 4 | 5/10 | 1/10 | 1/10 |
| 5 | 4/10 | 2/10 | 2/10 |
| 6 | 2/10 | 0/10 | 0/10 |
| 7 | 3/10 | 0/10 | 0/10 |
| 8 | 2/10 | 0/10 | 0/10 |
| 9 | 2/10 | 0/10 | 0/10 |
| 10 | 2/10 | 0/10 | 0/10 |
| 11 | 2/10 | 0/10 | 0/10 |
| 12 | 2/10 | 0/10 | 0/10 |
| 13 | 2/10 | 0/10 | 0/10 |
| 14 | 2/10 | 0/10 | 0/10 |
| 15 | 1/10 | 0/10 | 0/10 |
| 16 | 2/10 | 0/10 | 0/10 |
| 17 | 1/10 | 0/10 | 0/10 |
| 18 | 1/10 | 0/10 | 0/10 |

Table 12 Level of needle insertion

| Serial number | Number of patients | Level of needle insertion |
|---------------|--------------------|---------------------------|
| 1 | 25 | L3 |
| 2 | 5 | L1 |

Graphs:



REFERENCES

- Murali N, Natarajan S, Chandrasekaran S. Technique of computed tomography-guided chemical lumbar sympathectomy for peripheral vascular disease - a study of its efficiency in the Indian Population. International Surgery Journal 2016;3 (2):742-745.
- Nesargikar PN, Ajit MK, Evers PS, Nichols BJ, Chester JF. Lumbar chemical

- sympathectomy in peripheral vascular disease: does it still have a role? *Int J Surg.* 2009;7 (2): 145-149.
3. Grick David B. The Autonomic Nervous System. Chapter 16, in Ronald Miller's *Anaesthesia*, 8th edition: 348-350.
 4. Barreto Junior EPS, Nascimento JDS, de Castro APCR. Neurolytic block of the lumbar sympathetic chain improves chronic pain in a patient with critical lower limb ischemia. *Braz J Anesthesiol.* 2018; 68 (1):100-103.
 5. Serrano Hernando FJ, Martín Conejero A. Peripheral artery disease: pathophysiology, diagnosis and treatment. *Rev Esp Cardiol.* 2007; 60 (9): 969-82.
 6. Bombor I, Wissgott C, Andresen R. Lumbar sympathectomy in patients with severe peripheral artery disease: hemodynamics of the lower limbs determined by near-infrared spectroscopy, color coded duplex sonography, and temperature measurement. *Clin Med Insights Cardiol.* 2015; 8 (Suppl 2): 29-36.
 7. Jain K, Upadhyaya V, Varghese S. Chemical lumbar sympathectomy for lower limb rest pain associated with Thromboangitis Obliterans. *Karnataka Anaesthesia Journal* 2015; 1 (3): 157-159.
 8. Singh R, Shukla A, Kang LS, Verma AP. Chemical lumbar sympathetic plexus block in Burger's disease: Current Scenario. *Indian J Pain* 2014; 28 (1): 24-28.
 9. Cheng J, Daftari A, Zhou L. Sympathetic blocks provided sustained pain relief in a patient with refractory painful diabetic neuropathy. *Case Rep Anesthesiol.* 2012; 2012: 285328.
 10. Carroll I, Clark JD, Mackey S. Sympathetic block with botulinum toxin to treat complex regional pain syndrome. *Ann Neurol.* 2009; 65 (3): 348-351.
 11. van Eijs F, Stanton-Hicks M, Van Zundert J, Faber CG, Lubenow TR, Mekhail N, van Kleef M, Huygen F. Evidence-based interventional pain medicine according to clinical diagnoses. 16. Complex regional pain syndrome. *Pain Pract.* 2011; 11 (1): 70-87.
 12. Hughes-Davies DI, Redman LR. Chemical lumbar sympathectomy. *Anaesthesia.* 1976; 31 (8): 1068-1075.