

Sympathectomy as a Modality of Treatment for Chronic Phantom Limb Pain.

Kuda B Galketiya MS, FRCS¹, Vasanti G Pinto MD, FRCA², Anupa Herath MBBS³, R M D Rathnayaka MBBS⁴

¹ Consultant Surgeon/ Senior Lecturer, Department of Surgery, Faculty of Medicine, University of Peradeniya, Peradeniya, Sri Lanka.

² Consultant Anaesthetist/ Senior Lecturer, Department of Anaesthesiology, Faculty of Medicine, University of Peradeniya, Peradeniya, Sri Lanka.

³ Registra in Anaesthesiology, Teaching Hospital Peradeniya, Peradeniya, Sri Lanka.

⁴ Temporary Lecturer, Department of Anaesthesiology, Faculty of Medicine, University of Peradeniya, Peradeniya, Sri Lanka.

Abstract- Objective - To evaluate cervical sympathectomy as a modality of treatment for chronic phantom limb pain

Design- Clinical Observation

Setting- Teaching Hospital Peradeniya, Sri Lanka

Subject- A patient presented with phantom limb pain following left upper limb amputation due to a trauma 31/2 years ago. He complained of a Phantom limb sensation with painful writhing movements in fingers for which medical management failed to offer a lasting effect.

Methods - Thoracic sympathectomy of sympathetic chain from the 2nd to 4th ganglion was performed by Thoracoscopic approach. The resulting relief was analyzed.

Results- Review at Two weeks and Three months revealed the phantom pain has disappeared leaving the phantom sensation of the existence of the hand only with no pain which felt connected to the stump.

Conclusions- Cervical sympathectomy needs to be explored as a treatment modality for phantom limb pain.

Index Terms- Phantom limb pain, thoracic sympathectomy, Thoracoscopic.

I. INTRODUCTION

Phantom limb pain is a painful sensation originating from an amputated limb, having an incidence of 60–80% of all amputees, which has made it a significant problem¹. The incidence can be vary according to the age of the patient , congenital or traumatic in etiology, or the presence of infection or gangrene.^{2, 3, 4., 5, 6, 7}

These patients may be categorized as having a psychiatric problem and might not be subjected to proper treatment.⁸

Phantom limb pain can bear three different elements as painful sensation of the absent limb, sensation of the limb without pain or stump pain. These can present either in isolation or together¹. Non painful phenomena are not considered as clinically important.

When considering the etiology of the phantom limb pain, even though not fully explained so far, different mechanisms have been proposed, involving brain, spinal cord and peripheral factors. Psychological factors do not seem to contribute to the causation, but it is suggested that it may have role in affecting the severity and the course of the pain.

Since the etiology is not well explained the treatment modalities also fall in to the same line of uncertainty. The current treatment of phantom limb pain includes medical, non-medical

and surgical treatment. Pharmacological treatment consists of Sodium channel blockers, Anticonvulsants, Tricyclic Antidepressants, and Opioids. Surgical treatment options vary as Nerve block, Sympathectomy and CNS stimulation. As adjuvant therapy modalities transcutaneous nerve stimulation, Mirror therapy, Biofeedback Massage, Ultrasound, Physiotherapy, Sensory discrimination training exists. The sympathetic block can be obtained pharmacologically by a venous local anesthetic or thoracic sympathetic chain block or sympathectomy by pulse radiofrequency or surgically, all having reported varied success and failures⁹

This report explains a management of a chronic phantom pain with surgical thoracic sympathectomy which approached thoracoscopically.

II. CASE REPORT

A father of two children presented with a history of trauma to his left upper limb to a laundry machine 3 ½ years ago. The limb was salvaged by orthopedic intervention, but 9 days later the upper limb had to be amputated leaving 15cm long stump. The wound healed without any complication. From the day one onwards from the amputation, he could feel a phantom limb together with a residual pain in the stump. Patient could feel painful writhing movements in his medial 2 fingers and lesser pain in the other fingers in his absent limb. The pain was explained as persistent sharp shooting type pain scored as 8- 9 on the visual analogue scale with amplification 2-3 times a day. Initially patient received pharmacological treatment including, NSAIDs, Tramadol, Gabapentine, but the pain failed to respond to pharmacological treatment. An orthopedic intervention with reduction of the length of the stump bone segment and neurectomy was done but did not alleviate the pain. The medical treatment was escalated with Tricyclic anti-depressants, Carbamazepine, oral Ketamine and ultrasound guided local injection of Bupivacaine via a catheter to block the brachial plexus which only bought temporary relief for about 4 hours but failed to have a lasting effect.

Due to persistent pain in spite of the previous interventions patient underwent thoracoscopic Thoracic sympathectomy.

III. METHOD

After general anesthesia patient was placed semi prone and a near prone position was adopted by tilting the table. A single

lumen endotracheal tube with both lung ventilation was used. The camera port was placed in the 7th intercostal space just inferior to the angle of the scapula. CO₂ insufflation to a pressure of 8mmHg was used to obtain a partial lung collapse. Two 5mm working ports were placed; 5th intercostal space and 9th intercostal space in the mid axillary line. The thoracic sympathetic chain was identified. The mediastinal pleuron over the sympathetic chain was opened using ultrasonic dissector and the sympathetic chain from the 2nd ganglion to 4th was divided. Intercostal drainage was not used.

IV. RESULTS

There were no pre or post operative complications. In the post op day one patient couldn't feel the existence of amputated limb except for the hand which he could feel as if connected to the amputated stump (fig1) together with the writhing and trashing movement of the fingers and the chronic persistent pain related to hand, but no residual limb pain. Post op hospital stay was uneventful and the patient was discharged on the post op day 2. Review at Two weeks and three months in the clinic revealed he did not have any pain but only the sensation of the existence of the hand connected to the stump.

V. DISCUSSION

It is reported the occurrence of Phantom limb pain presenting both early or late but having more incidence of early occurrence^{2, 10}. This patient too who was having an early presentation and treatment for the last 3 and 1/2 years.

Usually the pain is intermittent³ but here in contrast he had a constant type of pain. Phantom pain is usually discussed in the distal parts of the missing limb¹¹ as this patient discussed his pain in the fingers.

Most instances the patients express the pain as same as pre amputation pain but in this patient it was not seen¹². Stump pain can be connected with the phantom pain and many patients who had suffered from stump pain can be subjected to phantom pain^{2, 11}. This patient too had a symptom like stump pain which was treated surgically and subsided but leaving the phantom pain. When considering treatment modalities, phantom limb pain is difficult to treat probably due to the uncertainty of the mechanism.¹ The ectopic and increased spontaneous and evoked activity from the periphery and Cell bodies in DRG, increase in this general excitability of spinal cord neurons, involvement of the sympathetic nervous system, increased activity in N-methyl d-aspartate (NMDA) receptor operated systems and Cerebral reorganization were described

In literature diverse treatment modalities were reported but surgical options are used as a last resort when other modalities have been tried. Surgical treatment options available are Stump revision, Sympatholytic Nerve block, Neurectomy, Sympathectomy and CNS stimulation consisting of Spinal cord stimulation. In this case patient has undergone various treatment including pharmacological treatment and other surgical treatment before attempting the sympathectomy.

There are no solid evidence for surgical and chemical sympathectomy for phantom pain, except stellate ganglion block

and thoracic sympathectomy in some neuropathic chronic pain conditions.^{9, 13, 14} The explanation of the pathophysiology may direct the rationale of how the treatment modality works. Sympathetic nerve sprouting in the dorsal root ganglia (DRG) contributes to the development and persistence of sympathetically maintained pain, Sprouting of sympathetic fibers and abnormal sympathetic sensory neuron interactions occur in the periphery were published in animal models.¹⁵

Sympathetic pre-ganglionic fibers for upper limb ganglia communicate with post-ganglionic fibers in T₂, T₃ and the stellate ganglion^{16, 17}. Usually, thoracic sympathetic block target the T₂ and T₃ ganglia. Sympathetic nerve block with injection of drugs that prevent the transmission of signals along sympathetic nerves may temporarily relieve pain where as in sympathectomy, sympathetic nerves are permanently destroyed in which a portion of the sympathetic nerve trunk in the thoracic region is cauterized. The sympathetic nerve chain runs parallel to the spine in the posterior mediastinum. In the past, the sympathetic chain was approached either through a major incision in the chest wall through the axillary or supraclavicular fossa while both procedures carrying a risk related to major surgery outweighing any potential benefits. The surgical access by the video -assisted thoracoscopy made it possible with only very small incisions with its simplicity and time efficiency and less post operative morbidity. Sympathectomy at 2nd 3rd and 4th Thoracic levels was helped by the clear zoomed in Thoracoscopic vision.

Phantom sensation is common in many amputees as having the feeling of the existence of the limb at the same shape and size but fades off gradually and only in some persists as phantom pain³. Mostly this fading off elicit a phenomenon of telescoping which results in gradual absorption of the limb to the stump^{9, 3, 11}. In this patient the fading off of the phantom pain (not only the phantom sensation) also showed the same telescoping.

VI. CONCLUSION

Cervical sympathectomy need to be explored as a treatment modality for phantom limb pain.

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CONFLICT OF INTEREST/DISCLOSURE SUMMARY

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AUTHORS

First Author – Kuda B Galketiya MS, FRCS, Consultant Surgeon/ Senior Lecturer, Department of Surgery, Faculty of Medicine, University of Peradeniya, Peradeniya, Sri Lanka.

Second Author – Vasanti G Pinto MD, FRCA, Consultant Anaesthetist/ Senior Lecturer, Department of Anaesthesiology, Faculty of Medicine, University of Peradeniya, Peradeniya, Sri Lanka.

Third Author – Anupa Herath MBBS, Registra in Anaesthesiology, Teaching Hospital Peradeniya, Peradeniya, Sri Lanka.

Fourth Author – R M D Rathnayaka MBBS, Temporary Lecturer, Department of Anaesthesiology, Faculty of Medicine, University of Peradeniya, Peradeniya, Sri Lanka.

Corresponding Author: Dr. Kuda B Galketiya, Consultant Surgeon/ Sen or iLecturer, Department of Surgery, Faculty of Medicine University of Peradeniya, Peradeniya, Sri Lanka., Fax no: +94812388371, Telephone: +94 777 884008, Email: kbalketiya@yahoo.com

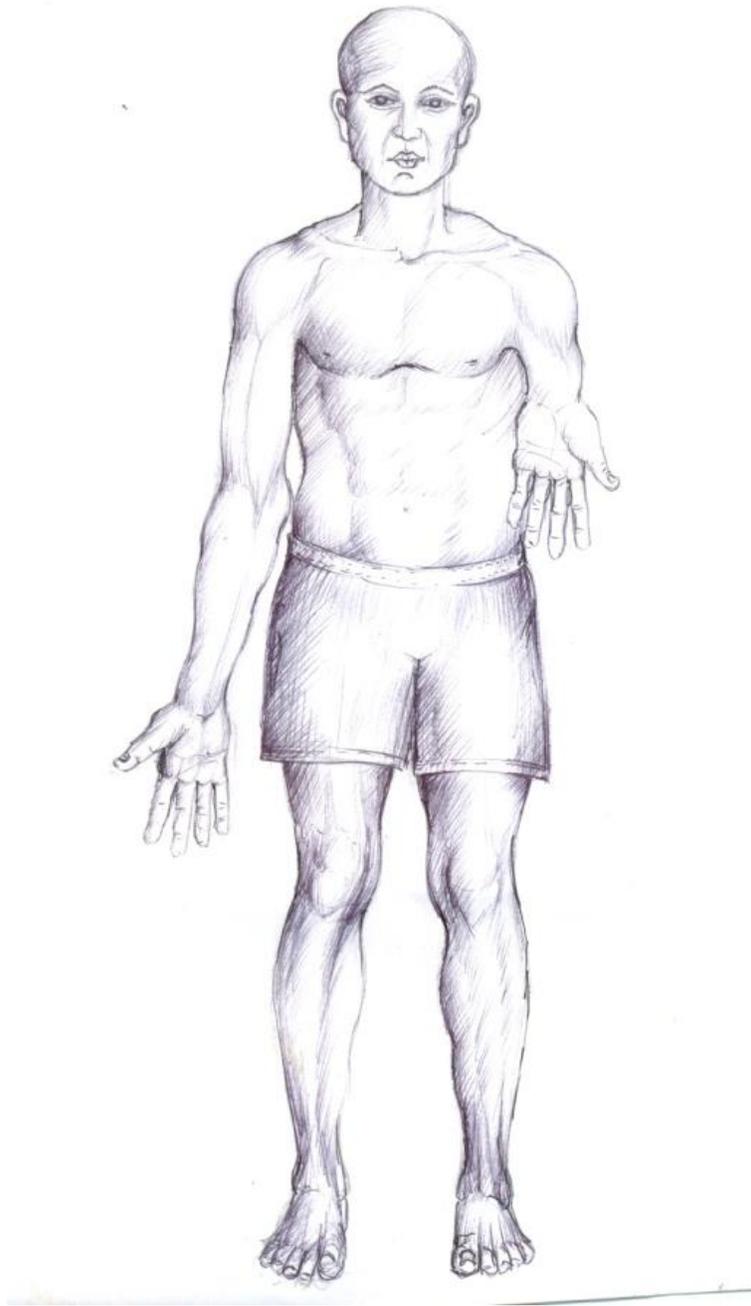


Figure 1: The resulted Phantom limb sensation without pain after the thoracic sympathectomy.