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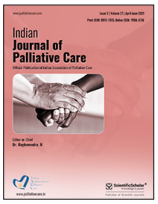
Indian Journal of Palliative Care



Case Report

Pulsed Radiofrequency of Stellate Ganglion for Neuropathic Pain Associated with Recurrent Pleural Leiomyosarcoma - A Case Report

Anand Murugesan[1], M. S. Raghuraman[2]

[1]Department of Anesthesiology and Pain Medicine, Apollo Hospitals, [2]Department of Anesthesiology and Pain Medicine, Sree Balaji Medical College and Hospital, BIHER, Chennai, Tamil Nadu, India.

ABSTRACT

Pleural leiomyosarcomas are rare soft-tissue sarcomas. Neuropathic pain associated with such tumours can be quite debilitating. We present the case of a 62-year-old woman with chronic neuropathic pain refractory to pharmacologic interventions in association with recurrent pleural leiomyosarcoma. Pulsed radio-frequency of the stellate ganglion was performed after due consideration and planning as a palliative measure to provide pain relief. The patient was discharged the same day with pain score 0/10 and followed up for 3 years. The unique features of this case report are: (1) Different approach of the treatment modality and (2) longer follow-up.

Keywords: Radiofrequency ablation, Pulsed radiofrequency, Stellate ganglion, Pleural malignancy

INTRODUCTION

Leiomyosarcomas are cancers of smooth muscle cells that can arise from any location but occur most often in the uterus, retroperitoneum, or intra-abdominal region. Pleural leiomyosarcoma is an extremely rare entity with only few reports of individual cases.[1] While the primary pathology affects the quantity of life,[1] the neuropathic pain associated with this tumor affects the quality of life too. Stellate ganglion (SG) or more precisely, cervico-thoracic sympathetic block is a commonly performed procedure for a wide variety of diagnostic and therapeutic indications[2] as well as for various complex regional pain syndrome (CRPS).[3,4] Although radiofrequency ablation (RFA) has been in clinical practice for three decades or more, the pulsed radiofrequency (PRF) is gaining popularity in the last decade because it is safer than the conventional RFA.[4] Furthermore, PRF has been applied in various clinical scenarios with promising results in the last few years.[5-7] Nevertheless, only a few case reports/series or clinical studies are available in the literature for its application in SG. To the best of our knowledge, no case has been reported so far on application of PRF in SG for neuropathic pain due to a pleural malignancy encroaching cervical roots (rhizotomy is usually preferred) that too with a follow-up for 3 years.

CASE REPORT

A 62-year old woman presented in August 2017 with the complaints of difficulty in swallowing and pain in the right upper chest wall radiating down the medial aspect of the right arm and forearm for the past 1 year. She underwent right-side thoracotomy for gross tumor resection of pleural leiomyosarcoma a decade ago and referred to our pain clinic for palliative care.

On physical examination in our pain clinic, dysesthesia along the medial aspect of right arm and forearm but no weakness of the right upper limb was noted. The diagnosis of C8 and T1 axonal neuropathy was made clinically and confirmed with nerve conduction study. Magnetic resonance imaging chest showed tumour recurrence encasing oesophagus, trachea, neural foramina of C7 and T1 encasing C8 and T1 nerve roots [Figure 1]. She was already receiving pharmacological treatment for pain with oral gabapentin 1200 mg, amitryptyline 50 mg and tapentadol 300 mg per day and still continued to have severe pain (visual analogue scale 8/10).

The patient was explained about various modalities such as surgical rhizotomy, chemical neurolysis, or RFA and she opted for diagnostic stellate ganglionic block followed by PRF treatment. After obtaining informed consent, the patient was

***Corresponding author:** M. S. Raghuraman, Department of Anesthesiology and Pain Medicine, Sree Balaji Medical College and Hospital, BIHER, Chennai, Tamil Nadu, India. drraghuram70@gmail.com

Received: 14 April 2021 **Accepted:** 12 September 2021 **EPub Ahead of Print:** 13 October 2021 **Published:** 03 December 2021 **DOI** 10.25259/IJPC_110_21

shifted to the operation room (OR) and positioned supine with continuous monitoring of all vital parameters. Using fluoroscopy, under local infiltration with 2% lignocaine, 23 G spinal needle (quincke) was placed at the junction between C7 vertebral body and transverse process and 8 ml of 2% lignocaine (preservative-free) was injected after ensuring linear spread of iohexol contrast. While 1 to 2 ml of local anaesthetic is sufficient to block the face, head and neck under fluoroscopy, or ultrasound guidance, 10 ml might be required to cover the upper limb also.[2] We have used 8 ml in this case and ensured its adequate spread by fluoroscopy. Two hours after the successful diagnostic SG block, the patient was taken to OR again and PRF of right-sided SG was performed using 21G RF cannula with 5 mm active tip for 3 cycles of each 60 s at three locations as described in the previous literature[2] (junction of vertebral body and transverse process, medial aspect of transverse process, caudally at anterolateral aspect of vertebral body) for a total duration 9 min with a set temperature of 42 degree Celsius. The sensory stimulation at 50 Hz and motor stimulation at 2 Hz done for a precise target needle placement and to rule out the close proximity of the needle tip to the cervical nerve root [Figure 2]. After the procedure, the right upper limb became hyperemic and warm which was 2.1°C more than the contralateral limb. The patient was discharged on the same day with oral gabapentin 300 mg a day for a month. Subsequently, the patient has undergone palliative radiotherapy. The patient was in continuous follow-up after the procedure for 3 years and the pain score remained 1/10 without any medications.

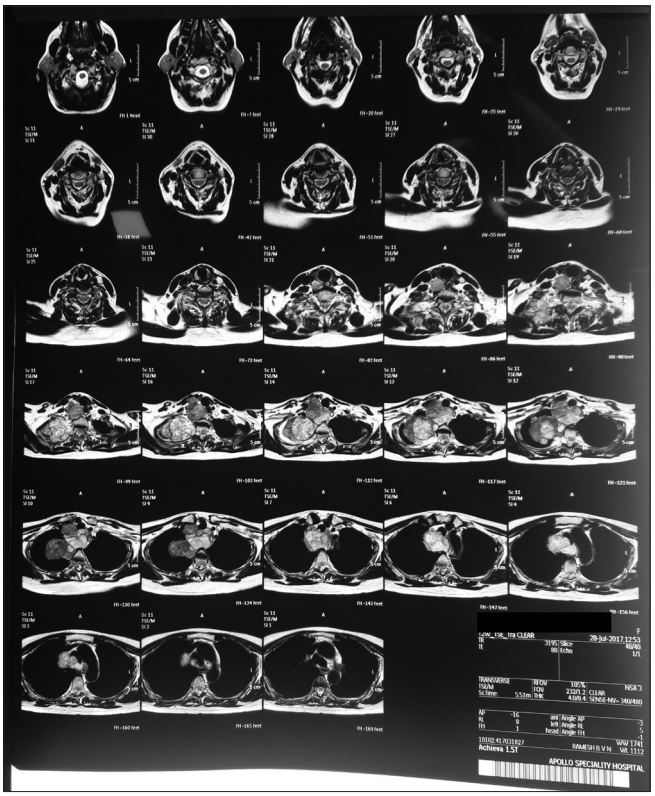


Figure 1: Tumour encasing oesophagus, trachea, neural foramina of C7, T1 and C8, T1 nerve roots.

Figure 2: Fluoroscopy showing final-needle placement and contrast confirmation.

DISCUSSION

There is a growing interest in the clinical application of radiofrequency treatment (RFT) for chronic pain because of its advantages such as better control over the targeted lesion size, confirmation of accurate needle positioning and availability of various modalities.[6] Although RFA has been in clinical practice for the past three decades or more, PRF, other modifications such as cooled RFT, bipolar RFT are becoming popular during the past few years. PRF of SG is useful for a wide variety of diagnostic and therapeutic indications, including CRPS.[4-7] While the RFA functions by providing alternate current thereby generating destructive heat in the range of 45–90°C, the PRF does it by producing two short bursts of current (20 ms) 2 times per second with production of temperature below 45°C.[6] Hence, PRF produces lesser destruction of nerve or other surrounding structures when compared to RFA making it a better option particularly in cases where nerve damage already exists.[6,8] PRF treatment is gaining popularity in the past few years because of these advantages. Nevertheless, a recently published prospective, randomised, comparative study has observed that RFA ('Thermal RF') of SG was better than PRF of SG for post-mastectomy pain syndrome in patients who were followed-up for 6 months.[9] Furthermore, RFA was significantly more effective than PRF for perineal pain,[10] while no significant difference was observed between them for application in sphenopalatine ganglion.[11,12] Therefore, the long-term effects of PRF versus RFA is a potential area for future research. In our case, we could attribute the long-term pain relief to the subsequent palliative radiation also to some extent, which could have relieved the nerve root compression of the tumour although PRF playing a major role at least in the initial period.

Only few case reports or clinical studies are available in the literature regarding application of PRF in SG. Rana *et al.*[4] have

used it for a liver transplant donor who had chronic neuropathy pain due to position-induced nerve injury (CRPS II) while Sekhri *et al*. have applied it for a case of ischemia of hand.[5] Ding *et al*. have observed that computed tomography (CT) guided PRF of SG produced statistically significant reduction in pain scores after 1 month with lesser complications when compared to CT-guided SG block in patients with post-herpetic neuralgia of face and upper limb.[7] A recently published retrospective study has observed that PRF of the thoracic sympathetic ganglion was more effective than cervical sympathetic chain for CRPS of upper extremity.[8] Although RFT is usually performed after testing the simple blocks at some intervals,[4] we have done it on the same day to avoid frequent visits for the patient and relatives considering her clinical condition.

To the best of our knowledge, no literature is available regarding application of PRF for chronic neuropathic pain due to pleural malignant tumour encasing the cervical nerve roots, with 3 years of follow-up as reported here. Surgical treatment in the form of rhizotomy is routinely preferred for this type of case. Furthermore, many previous studies have followed up the subjects for a maximum of 2 years,[6] with exception of only two studies which have followed up the patients in the range of 15-148 months or 4-52 months, comparing RFA vs PRF of sphenopalatine ganglion.[11,12] Various tools have been used to guide PRF of SG and include the use of fluoroscopy, CT, or ultrasound.[4-7,13,14] Ultrasound guidance was easier and safer,[13] with significantly lesser time of procedure.[14] In our case, we have used fluoroscopy as we were commonly preferring it at that time of doing this case 3 years ago. However, recently we prefer ultrasound as it is easier and safer as well as devoid of radiation hazards.

CONCLUSION

PRF of SG is an effective interventional palliative treatment for neuropathic pain of C8, T1 nerve roots in situations where the individual nerve root is not accessible due to tumor encasement such as in our case. Long-term effect of PRF versus RFA is a potential topic for future research.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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How to cite this article: Murugesan A, Raghuraman MS. Pulsed radiofrequency of stellate ganglion for neuropathic pain associated with recurrent pleural leiomyosarcoma - A case report. Indian J Palliat Care 2021;27:574-6.