

The Clinical Study of DRG Pulsed Radiofrequency Treatment for Chronic Musculoskeletal Disease

Xiaoqiong Yang¹; Yangyang Wang²; Yanqing Liu^{1*}

¹The Pain Department of Kunming Fifth People's Hospital, Yunnan, 650200, China.

²The Pain Department of Xian Daxing Hospital, Shanxi, China.

Corresponding Author: Yanqing Liu

The Pain Department of Kunming Fifth People's Hospital,
Yunnan, 650200, China.

Email: lyqTTY@126.com

Article Information

Received: Mar 29, 2024

Accepted: Apr 18, 2024

Published: Apr 25, 2024

SciBase Surgery - scibasejournals.org

Liu Y et al. © All rights are reserved

Citation: Yang X, Wang Y, Liu Y. The Clinical Study of DRG Pulsed Radiofrequency Treatment for Chronic Musculoskeletal Disease. SciBase Surg. 2024; 2(1): 1008.

Abstract

Objective: To observe the clinical effect of Chronic Musculoskeletal Pain (CMP).

Methods: 80 CMP patients admitted to our department from January 2022 to June 2023 were selected as the pain improvement after pulse radiofrequency treatment.

Results: The total response rate at 1 week and 4 weeks was 91.25% and 97.50%, respectively. The excellent rate at 4 weeks after treatment was significantly higher than at 1 week after treatment. VAS scores were significantly lower at 1 week and 4 weeks after treatment than before treatment ($P < 0.05$).

Conclusion: Pulsed radiofrequency therapy for CMP has a significant clinical effect, significant pain improvement, and significantly improved quality of life. It is a widely used interventional therapy in chronic pain.

Keywords: Pulsed radiofrequency; Dorsal Root Ganglion (DRG); Interventional therapy; Chronic Musculoskeletal Pain (CMP).

Introduction

The prevalence rate of chronic musculoskeletal pain is very high, which is easy to cause serious mental disorders and disability, and brings serious burden to the patient's family and society. Pulsed radio frequency (Pulse Radiofrequency, PRF) treatment was first proposed by the Dutch physician Sluijter in 1995 [1], Clinically, it is widely used in the treatment of chronic pain. In order to explore the clinical treatment effect of pulse radiofrequency treatment for Chronic Musculoskeletal Pain (CMP), 80 CMP patients admitted to our department from January 2022 to June 2023 were selected as the improvement of pain degree and quality of life of patients after pulse radiofrequency treatment, which is reported as follows:

Data and methods

General information: We selected 80 patients with chronic pain hospitalized from January 2022 to June 2023, who all

had Chronic Musculoskeletal Pain (CMP) on admission. The 80 patients, 45 were male and 35 were female; age was 25 to 80 years, mean age (68.52 ± 5.48). The VAS score of the pain level was above 6.

Inclusion and exclusion criteria

Inclusion criteria: (1) CMP at admission, mostly neck and shoulder pain, low back pain and hip and knee joint pain, some patients with limb numbness; (2) patients gave informed consent for the study and approved by the hospital ethics committee.

Exclusion criteria: (1) those with severe organ failure; (2) those receiving analgesics or other treatment measures within the last 3 months.

Treatment methods

Operation method of pulse radiofrequency treatment: radiofrequency pulse treatment of cervical, thoracic and lumbar

DRG according to the lesion site, with parameters according to the conventional radiofrequency operation, temperature 42°C, frequency of 2 HZ and RF persistent current of 20 ms for 6 min. 20 milliseconds.

Observing indicators

Visual analogue scoring was used (Visual Analogue Scale, VAS). Pain scores of patients before and 1 and 4 weeks after treatment.

Score of life quality (KPS score) was used to evaluate the improvement of life quality before and after treatment. The score is 0 to 100, 0 is the worst quality of life; 100 is the highest quality of life.

Table 1: Comparison of post-treatment efficacy (VAS weighted value %) between the two groups.

Effect	Clinical cure	Good	Valid	No valid	Excellence	Total effective rate
First week after treatment	46(57.50%)	17(21.25%)	10(12.50%)	7(8.75%)	78.75%	91.25%
Fourth weeks after treatment P price	62(77.50%)	10(12.50%)	6(7.50%)	2(2.50%)	90.00%* <0.05	97.50%

Note: *indicates P<0.05 compared to one week after treatment.

Table 2: Comparison of VAS scores before and after treatment ($\bar{x} \pm s$).

Time	Example number	VAS grade
Pretherapy	80	7.98±1.31
One week after treatment	80	2.72±0.45*
Four weeks after treatment	80	2.15±0.36*

Note: *indicates P<0.05 compared to pretherapy

Table 3: Comparison of KPS grade before and after treatment ($\bar{x} \pm s$).

Time	Example number	KPS grade
Pretherapy	80	30.28±8.26
One week after treatment	80	85.59±9.62*
Four weeks after treatment	80	88.27±9.51*

Note: *indicates P<0.05 compared to pre-treatment.

Results

Comparison of efficacy at 1 week and 4 weeks after treatment: the excellent rate of 4 weeks after treatment was significantly higher than 1 week after treatment (P<0.05). The VAS scores at 1 week and 4 weeks after treatment were significantly lower than those before treatment, and the difference was significant (P<0.05). There was no significant difference in VAS scores between 1 week and 4 weeks after treatment (P>0.05). Comparison of life quality before and after treatment. The KPS score at 1 week and 4 weeks after treatment was significantly higher than that before treatment, with a statistically significant difference (P<0.05). There was no significant difference in KPS scores between 1 week and 4 weeks after treatment (P>0.05).

Discussion

In this group, 80 patients with Chronic Musculoskeletal Pain (CMP) had different degrees of pain on admission, some patients had concomitant symptoms such as depression and physical decline, and previous treatment required medication for analgesia. However, long-term use of analgesic drugs has

Statistical treatment

All clinical data were entered into the SPSS22.0 statistical software. At 1 and 4 weeks after treatment the total effective rate and excellent rate were compared by the chi-square test, and the post-treatment efficacy in the two groups was expressed by the VAS weighted value. (VAS weighted = post-treatment VAS-pre-treatment VAS/post-treatment VAS.100/100)VAS weighted value >75% = clinical cure, 75% <50% = good, 50% <25% = valid, <25% = invalid. The VAS scores before and after treatment were compared by the t-test. P<0.05 was considered to be statistically significant.

adverse reactions, and the analgesic effect time is short, and the pain is easy to relapse. There are great concerns in long-term clinical use. Therefore, the choice of minimally invasive and non-drug treatment for CMP patients has become an urgent problem to be solved in clinical practice.

Pulsed radiofrequency therapy is a common minimally invasive interventional technique, and its treatment mechanism is mainly [2] PRF acts as neuroregulated by altering synaptic conduction. There are also studies that believe that [3]: PRF intervention on the injured peripheral nerve can significantly improve the pain behavior and cause changes in the expression of cyclic nucleotide-gated cation channels (Hyperpolarization activated Cyclicnucleotide-gated cation channels, HCN) in DRG. This phenomenon suggests that HCN may be involved in the neuroregulatory process of PRF. Studies have shown that [4,5]: PRF acts on DRG and may have an analgesic effect by inhibiting microglia activation in the dorsal horn of the spinal cord.

The RF therapy technology includes both pulsed RF and continuous RF modes. Pulsed RF action is the 480 ms interval after the RF current lasts for 20 ms, so that the high heat has enough time to spread to the tissue, controls the target temperature below 42°C, and does not cause local tissue degeneration, so as to overcome the possible complications caused by continuous RF. It is widely used in the treatment of diseases such as neck and shoulder pain, low back pain, limb bone and joint pain and myofascial pain syndrome. Another study showed that 51 patients with shoulder pain were divided into treatment group and sham group. The results of preoperative and postoperative Oxford shoulder score, concise pain assessment scale, and analgesic dosage and side effects showed that the patients in the treatment group continued to relieve pain and their functional status was significantly improved. It suggests that in the clinical treatment of CMP such as shoulder pain, pulse radiofrequency therapy also has certain efficacy, proving that PRF can not only treat neuropathic pain, but also be effective for joint pain and muscle pain. And the operation is simple, the related complications are few, significantly reduce the pain after treatment.

In this group, 80 patients with CMP were effective at 1 week and 97.25% and 97.50%. VAS scores significantly decreased and quality of life significantly improved after treatment. In particular, the excellent rate reached 90% after 4 weeks after

treatment, which was significantly higher than one week after treatment, indicating the recent good efficacy of radiofrequency pulse treatment for CMP. There are reports [6], the mean duration of pain relief in patients treated with pulsed radiofrequency dorsal root ganglion averaged 4.74 months. However, the medium and long-term efficacy of PRF dorsal root ganglion treatment, which was slightly insufficient.

Conclusion

In conclusion, the pulse radiofrequency treatment of CMP has significant clinical effect, significant pain improvement, significantly improved survival quality, low complication rate, and accurate treatment temperature control. It is necessary to do further in-depth research on its treatment mechanism in the future.

Funding: The study was approved by the hospital ethics committee.

Conflict of interest: All authors declare no conflicts of interest.

References

1. Chen Yuyuan and Zeng Bin Current status and progress of radiofrequency treatment of chronic pain. *Journal of Practical Pain*. 2008; 4(2): 133-137.
2. Chua NH, Vissers KC, Sluijter ME, Pulsed radiofrequency treatment in interventional pain management, mechanisms and potential indications-a review, *Acta Neurochir (Wien)*. 2011; 153: 763-771.
3. Liu Yiming, Zhang Tingjie, Feng Yi. Pulsed RF HCN on the dorsal root ganglion of CCI rats. The effects of channels [J]. *Chinese Journal of Pain Medicine*. 2013; 19 (6): 323-329.
4. Cho HK, Cho YW, Kim EH, et al. Changes in pain behavior and glial activation in the spinal dorsal horn after pulsed radiofrequency current administration to the dorsal root ganglion in a rat model of lumbar disc herniation, laboratory investigation. *J Neurosurg Spine*. 2013; 19(2).
5. Park HW, Ahn SH, Son JY, et al. Pulsed radiofrequency application reduced mechanical hypersensitivity and microglial expression in neuropathic pain model. *Pain Med*. 2012; 13(9): 1227-1234.
6. Cohen SP, Sireci A, Wu CL, et al. Pulsed radio frequency of the dorsal root ganglia is superior to phannacotherapy or pulsed radiofrequency of the intercostal nerves in the treatment of chronic postsurgical thoracic pain. *Pain Physicjan*. 2006; 9: 227-235.