

# Gasserian ganglion injected with Adriamycin successfully relieves intractable trigeminal nerve postherpetic neuralgia for an elderly patient

## A case report

Bixin Zheng, MD, Li Song, MD PhD\*, Hui Liu, MD PhD

### Abstract

**Rationale** Effective treatments for trigeminal nerve postherpetic neuralgia (PHN) are limited. Adriamycin (doxorubicin) has been applied to the treatment of neuropathic pain. This study reports a new treatment: Adriamycin injected to Gasserian ganglion for an elderly patient with the intractable trigeminal nerve PHN.

**Patient concerns** A 75-year-old man complained of lancinating, burning pain in the right mandibular branch of the trigeminal nerve (V3) for 3 months after rash eruption.

**Diagnoses** Trigeminal nerve PHN.

**Interventions** Approximately 0.5 mL of 0.25% Adriamycin and 20 mg methylprednisolone injected to Gasserian ganglion through the foramen ovale with computer tomography guidance.

**Outcomes** The visual analog scale was 10 of 100 throughout the 1-month follow-up, and oxcarbazepine had also been tapered. The patient remained free of pain at the 12-month follow-up.

**Lessons** The treatment of Adriamycin injection to Gasserian ganglion is effective and safe, and may be considered as an alternative treatment for trigeminal nerve PHN. However, more research is needed to verify the validity.

**Abbreviations:** CT = computer tomography, PHN = postherpetic neuralgia, VAS = visual analog scale, VZV = varicella zoster virus.

**Keywords:** Adriamycin, elderly patient, postherpetic neuralgia, trigeminal nerve

## 1. Introduction

It has been reported that approximately 75% of elderly patients infected with herpes zoster will develop postherpetic neuralgia (PHN). Pain is the main symptom of PHN associated with neuronal damage, and if the viruses infect Gasserian ganglion, it makes the condition frustrating.<sup>[1,2]</sup> Effective treatments for trigeminal nerve PHN are limited, pain relief is not ideal, patients respond poorly to carbamazepine, oxcarbazepine, and nerve

blocks. In addition, this severe neuropathic pain affects the daily activities of patients, such as chewing, talking, eating, and drinking.<sup>[3]</sup> Adriamycin, which was used as an antitumor drug, has shown neurotoxicity in recent years, and has been applied to the treatment of neuropathic pain.<sup>[4]</sup> Here, we report a case of an elderly patient with the intractable trigeminal nerve PHN being successfully treated by destructing Gasserian ganglion with Adriamycin.

## 2. Case report

A 75-year-old man complained of lancinating, burning pain in the right mandibular branch of the trigeminal nerve (V3) for 3 months after rash eruption, which had been diagnosed as trigeminal nerve PHN. The 100-mm visual analogue scale for his pain was rated 80 mm on a scale from 0 (no pain) to 100 (worst pain imaginable). Oxcarbazepine and oxycodone at doses of 300 and 10 mg, respectively, twice a day, alprazolam the dose of 0.4 mg before sleep and topical lidocaine patches were prescribed. The mandibular nerve block was performed with 1 mL of 0.25% ropivacaine and 20 mg methylprednisolone. However, the patient complained that his pain was relieved by only 30% for 6 hours. Then intravenous infusion of lidocaine (3 mg/kg) was performed over a period of 1 hour under careful monitoring. After 1 week elapsed, his pain was relieved minimally and his visual analog scale (VAS) score was still 70 of 100. Radio-frequency thermocoagulation was not applicable to this patient because of the implantation of artificial cardiac pacemaker.

With the patient's informed consent, we administered Adriamycin injection to Gasserian ganglion with computer

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none.

Department of Pain Management, West China Hospital, Sichuan University, Chengdu, China.

\*Correspondence: Li Song, Department of Pain Management, West China Hospital, Sichuan University, No. 37 Guoxue Xiang, Chengdu, Sichuan 610041, China (e-mail: songli\_76@163.com)

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**Figure 1.** Computer tomography (CT) image shows the needle was placed in the foramen ovale.

tomography (CT) guidance. The puncture needle (type: 7#) advanced and arrived at the foramen ovale by using intermittent CT guidance (Fig. 1). Once the pain was evoked in V3 area and no blood or cerebrospinal fluid was sucked out, 0.5 mL of 1% lidocaine was then injected. After 5 minutes observation, the pain of this patient was alleviated by 50% with no adverse reaction. Subsequently, 0.5 mL of 0.25% Adriamycin and 20 mg methylprednisolone were injected. After 24 hours of Adriamycin injection, the patient's pain was reduced to a VAS score of 40/100 and there was no adverse reaction. One week later, this patient accepted the same procedure again. And his VAS was further reduced to 20/100. One week after the second procedure, his VAS score decreased to 15/100 and all medications except oxcarbazepine were discontinued. The VAS was 10/100 throughout the 1-month follow-up, and oxcarbazepine had also been tapered. The patient remained free of pain at the 12-month follow-up.

### 3. Discussion

After the initial infection of varicella zoster virus (VZV), presenting as chickenpox, the viruses laid dormant in the sensory ganglia like Gasserian ganglion. When immunity decreased, the VZV reactivated and caused neuronal damage, sensory fibers demyelination, and the herpes in the related dermatomes.<sup>[5]</sup> PHN is the persistent neuropathic pain after the rash onset. The characteristics of PHN are dysesthesia, allodynia, paresthesia, and hyperalgesia. Trigeminal nerve PHN occurs in approximately 5% of all PHN patients, and dramatically affects the patient's quality of life and function, particularly among the elderly. Treatment for trigeminal nerve PHN is more complicated and challenging. Previous studies show that patients respond poorly to systemic pharmacological therapies, and the effective method is to target the area of nerve injury. The blockade of Gasserian ganglion with local anesthetics and steroid could relief the pain.<sup>[6]</sup> In this case, we first used oxcarbazepine, oxycodone, lidocaine patches, lidocaine infusion, and mandibular nerve block. However, the pain relief was not obvious.

Adriamycin, which was used as an antitumor drug, has shown neurotoxicity in recent years, and has been applied to the treatment of neuropathic pain.<sup>[4]</sup> Reports indicated that dorsal root ganglion destructed by 0.25% Adriamycin injection in

paravertebral intervertebral foramen could effectively relieve pain of patients with PHN.<sup>[7]</sup> In this case, we found that injection of Adriamycin to Gasserian ganglion successfully relieved the trigeminal nerve PHN as well. We used CT guidance to make sure that the needle arrives at the foramen ovale and Adriamycin injected to the ideal area. No serious complication happened, no nausea, vomiting, and cardiovascular system fluctuation in the procedure. After the operation, pain relived significantly and the effect lasted for 12 months. This case report demonstrates that Adriamycin injected to Gasserian ganglion is effective and safe, and may be considered as an alternative treatment for trigeminal nerve PHN. The mechanism of Adriamycin's action to dorsal root ganglia and Gasserian ganglion might be that Adriamycin was absorbed by peripherals of nervous fibers and was retrogradely transported along axoplasm to corresponding distributed neurons resulting in neuronal degeneration and necrosis.<sup>[8]</sup> Our findings come from the results of a single case, so more case series are needed to determine the efficacy of the treatment of Adriamycin injection.

### 4. Conclusion

The treatment of Adriamycin injection to Gasserian ganglion is effective and safe, and may be considered as an alternative treatment for trigeminal nerve PHN. However, more research is needed to verify the validity.

### 5. Ethical approval

The patient has provided written informed consent for the publication of this case and any accompanying images.

### Author contributions

**Conceptualization:** Li Song, Hui Liu.

**Data curation:** Bixin Zheng.

**Formal analysis:** Li Song.

**Investigation:** Bixin Zheng, Li Song.

**Writing – original draft:** Bixin Zheng, Li Song.

**Writing – review and editing:** Bixin Zheng, Li Song, Hui Liu.

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