

**Management of great auricular neuralgia confirmed by electrophysiological examination: A case report**

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**Introduction**

The great auricular nerve (GAN) is a sensory branch of the cervical plexus originating from the C2 and C3 nerve roots that innervates the external ear, mandibular angle, and parotid gland. [1,2,3] Idiopathic GAN neuralgia is a rare condition, and branches of the GAN overlap with other cervical and cranial nerves. Therefore, the diagnosis of GAN neuralgia is challenging and can be confused with other facial neuralgias. Here, we report the first case of GAN neuralgia confirmed by electrophysiological examination that was treated successfully with ultrasound-guided GAN block.

**Case report**

A 55-year-old female patient presented with a 12-month history of intractable pain around her left ear and mandible. She had previously undergone an ear-related examination and brain magnetic resonance imaging (MRI). There was no abnormal finding. She was diagnosed with clinical trigeminal neuralgia and started preventative medications over the span of 1 year. Despite receiving multidisciplinary medical management, the patient's symptoms did not improve. Secondary to her persistent intractable pain, the patient was referred to our physical medicine and rehabilitation clinic for further evaluation. Given the distribution of her pain, the patient's symptoms were suspected to be not only trigeminal neuralgia but also other pathologies, including great auricular neuralgia. An electrophysiological examination was performed for the exact diagnosis. For the electrophysiological examination of the GAN, recording electrodes were placed on the back of the patient's earlobe 2 cm apart. Stimulation was applied along the lateral border of the SCM muscle 8 cm from the active electrode.[4] And blink reflex tests were also performed. The examination revealed prolonged latency of the left GAN sensory nerve action potential and a normal range of blink reflex (Table 1). Eventually, the patient was diagnosed with incomplete lesion of the left GAN. Following the exact diagnosis of great auricular neuralgia, 2 rounds of ultrasound-guided GAN block was conducted using a local anesthetic agent and steroid (Figure 1). The patient reported immediate pain relief with a total absence of periauricular and lateral headache and symptoms did not recur. Follow-up electrophysiological examination performed 3 months later showed that the latency of the sensory action potential of the left GAN had been restored (Table 1).

**Discussion**

This is the first report of a case to confirm idiopathic GAN neuralgia by electrophysiologic study, suggesting the possibility of using electrophysiology for the diagnosis of chronic

refractory periauricular and lateral headache in patients. In conclusion, electrophysiologic studies are helpful for accurate diagnosis in patients with unclear pain in the periauricular and lateral head and to quantify the effect of interventions in GAN lesions. Further investigations are needed to ensure the reliability of the electrophysiological diagnosis of GAN neuralgia.

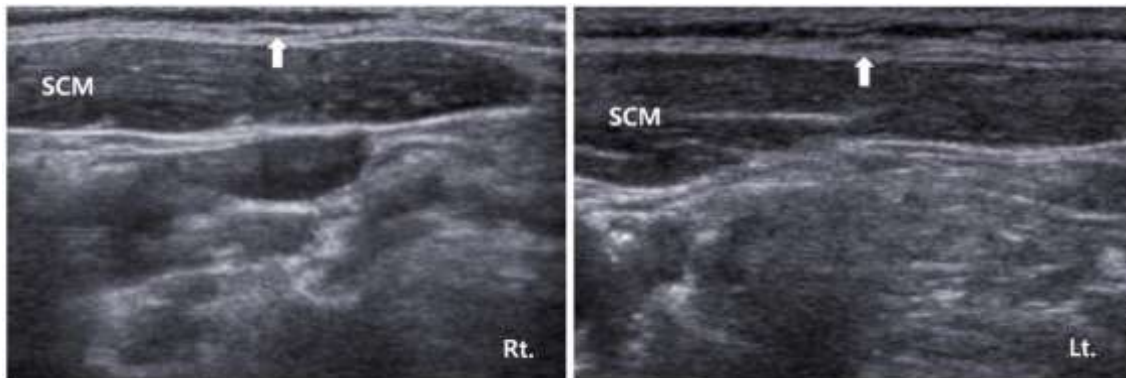


Fig 1. Transverse view on ultrasound depicting the right and left great auricular nerve (arrow) above the sternocleidomastoid muscle, showing a slightly enlarged GAN on the symptomatic left side.

Table 1. Sensory nerve action potential of the great auricular nerve at the initial assessment and 3 months following nerve block.

	Onset latency (ms)	Peak latency (ms)	Peak-to-peak amplitude ( $\mu$ V)
<b>Initial</b>			
Right GAN	1.45	2.00	10.4
Left GAN	1.90*	2.65*	10.0
<b>3 months after GAN block</b>			
Right GAN	1.40	1.95	13.9
Left GAN	1.45	2.05	14.6

\* prolonged latency of sensory nerve action potential

GAN, greater auricular nerve