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Pterygopalatine fossa segment neurectomy of maxillary nerve through maxillary sinus route in treating trigeminal neuralgia

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ABSTRACT

Purpose: To explore an effective surgical treatment for pain in the distribution area of the maxillary branch of trigeminal nerve (TN).
Materials and methods: Twenty-six patients with pain in the distribution of the maxillary branch of TN were followed up after they had undergone pterygopalatine fossa segment neurectomy of maxillary nerve through maxillary sinus route.
Results: In all cases, the pain initially resolved after operation, with anaesthesia or paraesthesia in the operated side of the maxillary nerve-distributed area. After a mean follow-up period of 24 (range 3–36) months, 19 (73.08%) of the 26 patients had an excellent response, 5 (19.23%) had a good response, 2 (7.69%) had a fair response, and none (0%) had a poor response. One patient had a recurrence with palatal pain 3 months after the operation.
Conclusions: The maxillary sinus route can provide a clear vision for sectioning of the maxillary nerve. This new surgical technique has proven to be safe and effective. It provides another option for the weak elderly who are intolerant of craniotomy or patients who have contraindications for craniotomy when radiofrequency thermocoagulation (RFT) and percutaneous glycerol neurolysis (PGR) treatment is not possible.

1. Introduction

Trigeminal neuralgia (TN) is a neurogenic disease, which is the most common cause of neurosurgical facial pain in adults, typically presenting in the fourth or fifth decade. Different from other facial pains, the pain caused by TN is episodic, lightning pain and is strictly localized in the TN region. It can be provoked spontaneously or by a trigger point. The incidence rate is estimated to be 4–13 per 1,00,000 people each year (MacDonald et al., 2000). Although not life-threatening and asymptomatic in intermittent periods, it can seriously affect a patients' quality of life. The cause and pathogenesis of trigeminal neuralgia are still not clear. The initial treatment is medical: carbamazepine is the first drug of choice, though phenytoin or baclofen, or a combination, can also be used. In one recent report, bupivacaine HCL was used to treat TN (Dergin et al., 2012). If pain control cannot be achieved or drugs cause unacceptable adverse effects, surgical intervention should be considered.

In this study, to explore an effective surgical treatment for trigeminal neuralgia, we used pterygopalatine fossa segment neurectomy of the maxillary nerve through a maxillary sinus route in treating 26 patients suffering maxillary nerve pain.

2. Materials and methods

2.1. Clinical information

Twenty-six patients with idiopathic trigeminal neuralgia attending our department between July 2009 and February 2012, were enrolled in our study. Among them, there were 11 males and 15 females, with a mean age of 52 years (range 37–72). The duration of the symptoms ranged from 6 months to 29 years. All patients had been prescribed carbamazepine with unsatisfactory results. One patient had recurrent pain after infraorbital nerve avulsion. Computer tomography (CT) or magnetic resonance image (MRI) was performed to eliminate the possibility of secondary trigeminal neuralgia caused by cranial tumour or multiple sclerosis.

2.2. Surgical techniques

Patients were operated on in a supine position under general anaesthesia via nasal–tracheal intubation of the healthy side. An intraoral mucoperiosteal incision was made running from the

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buccal sulcus of the upper lateral incisor to the first molar on the affected side. Subperiosteal undermining was performed to extensively expose the infraorbital foramen and the infraorbital neurovascular bundle (Fig. 1). On the anterior wall of maxillary sinus, with infraorbital foramen as its centre, a round bone window with a diameter of 2 cm was made to reveal the maxillary sinus (Fig. 2). The neurovascular bundle was freed at the infraorbital foramen after the bone around was chiselled away. The superior and posterior maxillary sinus mucosa was then dissected along the bundle and the entire neurovascular bundle in the maxillary sinus was released (Fig. 3) after the superior and posterior wall of the maxillary sinus was exposed (Fig. 4). Next, the inferior bone of the infraorbital canal and infraorbital fissure was removed (Fig. 5). A round bone window with a diameter of 1.5 cm was made at the upper one third of the posterior wall of the maxillary sinus (Fig. 6). Extreme caution should be exercised when entering the pterygopalatine fossa to avoid damaging the maxillary artery (Fig. 7). The pterygopalatine fossa segment of the maxillary nerve was found at the pterygopalatine fossa after the superior bony wall of the maxillary sinus was removed. It was then bluntly dissected in a posterosuperior direction and severed 0.5 cm–1 cm away from

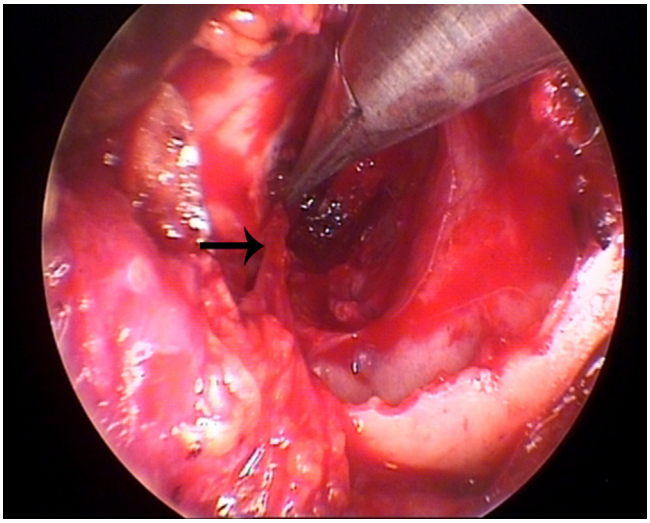

Fig. 3. Liberation of the entire neurovascular bundle in the maxillary sinus.

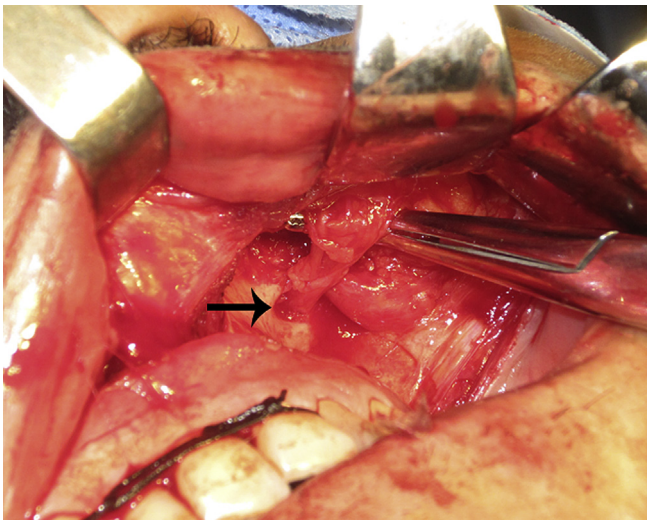

Fig. 1. Exposure of the infraorbital fossa.

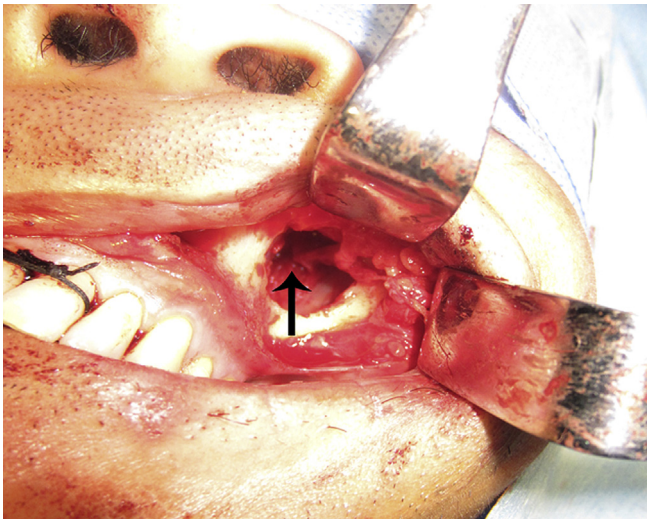

Fig. 4. Exposure of the superior and posterior wall of the maxillary sinus.

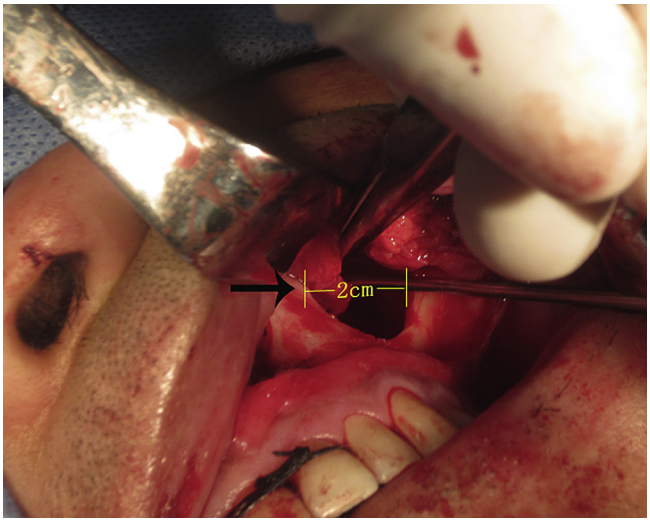

Fig. 2. Access to maxillary sinus via bone window with a diameter of 2 cm in the anterior wall of maxillary sinus.

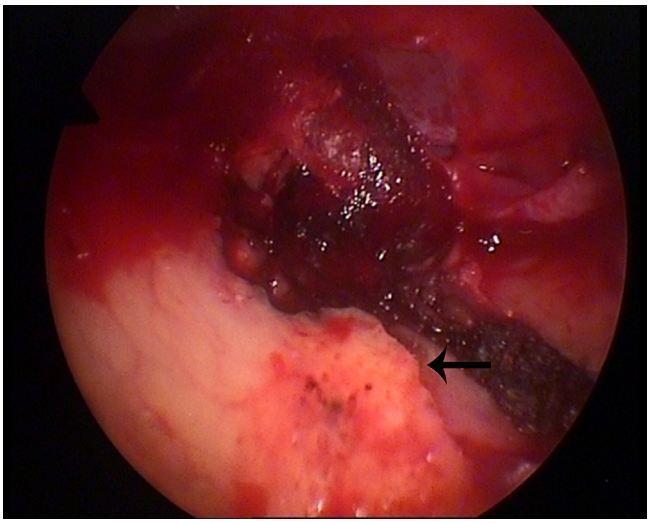

Fig. 5. Removal of the inferior bone of the infraorbital canal and infraorbital fissure.