Annals of Medicine and Surgery 76 (2022) 103578

Contents lists available at ScienceDirect

Annals of Medicine and Surgery

journal homepage: www.elsevier.com/locate/amsu

Technical Note

Temporal surgery for chronic migraine treatment: A minimally-invasive perspective

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The peripheral theory of Migraine Headache (MH) pathogenesis has been widely popularized and recognized as one of the main etiologies of MH. Indeed, chronic compression of terminal branches of craniofacial nerves caused by surrounding structures (e.g., muscles, vessels, and fascial bands) can cause neuronal hyperexcitability and inflammation acting as potential trigger for MH attacks; in this scenario, the surgical treatment of the temporal area described as Site V relies on the peripheral release of sensory auriculotemporal nerve entrapment [1–7]. In this paper, we describe our mini-invasive approach for the deactivation of the auriculotemporal nerve in migraine surgery [8–10].

1. Surgical technique

All patients previously have to undergo a full examination by neurologists to confirm the diagnosis of migraine headache in accordance with the guidelines established by the International Headache Society. The patients suffer from chronic refractory migraine starting from the temporal region and had failed multiple preventative medications. In our experience, the auriculotemporal nerve (ATN) is the temporal MH trigger, given the close relationship with the superficial temporal artery (STA). Therefore, our surgical procedure primarily aims at eliminating the pulsatile irritation of the STA to the ATN by ligating or coagulating the artery prior to and above the intersection or coiling segment. Before local anaesthesia, we mark a 3-cm horizontal cutaneous incision where patients pinpoint the painful spot above the auricular helix at level of temporal area (Fig. 1). The cutaneous incision has to be performed with the blade parallel to the surrounding hair shaft, not to injure the underlying hair bulbs (Fig. 2); this results in a less noticeable postoperative scar. Dissection is then carried out with the help of blunt tipped scissors to expose and isolate both the ATN and STA, which is ligated both proximally and caudally to the area of nerve-artery intersection (Fig. 3). We usually observe a strict ATN-STA relationship (being either a simple crossover or a helical intertwining). The procedure is completed by absorbable 3-0 cutaneous sutures (Fig. 4).

Fig. 1. Horizontal cutaneous incision above the auricular helix in the temporal area. Superficial temporal artery (triangle) in close proximity to the auriculotemporal nerve (circle) identified during migraine surgery of the temporal (site V) trigger site. (Left temple; top of the figure: anterior plane; right of the figure: top of the cranium).

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https://doi.org/10.1016/j.amsu.2022.103578
Received 9 February 2022; Received in revised form 31 March 2022; Accepted 31 March 2022
Available online 2 April 2022

Fig. 2. The cutaneous incision has to be performed with the blade parallel to the surrounding hair shaft, not to injure the underlying hair bulbs. (Left temple; top of the figure: anterior plane; right of the figure: top of the cranium).

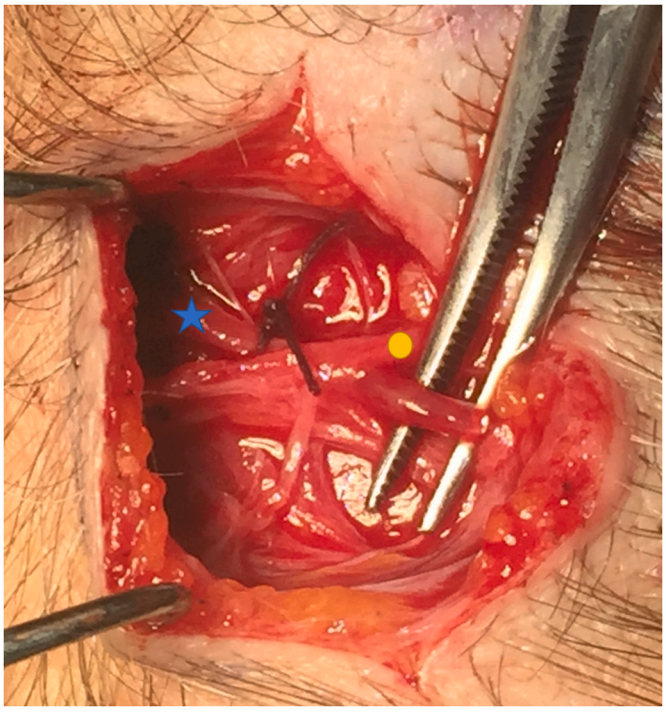

Fig. 3. Close auriculotemporal nerve (ATN) and superficial temporal artery (STA) relationship. The STA (blue star) is ligated both proximally and distally the ATN (yellow circle). (Left temple; top of the figure: anterior plane; right of the figure: top of the cranium). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

Fig. 4. The procedure is completed by absorbable 3-0 cutaneous sutures. (Left temple; top of the figure: anterior plane; right of the figure: top of the cranium).

From June 2011 till January 2022, we have performed MH decompression surgery over 205 patients with site V temporal migraine trigger site. After a mean follow-up of 21 months (range: 3–67 months), patients complaining for temporal MH had 83% positive surgical outcome (50% complete MH elimination, 33% significant improvement). Only rare minor complications are usually reported (e.g., oedema, paresthesia, hematoma/ecchymosis, and numbness). Numbness, in particular, occurred, in our experience, in 5.7% of the patients (lasting <1 year, 163 days on average).

In conclusion, this minimally invasive approach allows to obtain satisfying and reproducible results, with a low complication rate.

Sources of funding

None.

Ethical approval

N/A.

Consent

N/A.

Author contribution

Giorgio Raposio planned and wrote the manuscript, Edoardo Raposio ideated and performed the surgeries.

Trial registry number

1. Name of the registry:
2. Unique Identifying number or registration ID:
3. Hyperlink to your specific registration (must be publicly accessible and will be checked):

Guarantor

Edoardo Raposio.

Declaration of competing interest

None.

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