Topographical anatomy of the hypoglossal nerve

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Aim: Continuous positive airway pressure (CPAP) is a commonly used treatment for obstructive sleep apnoea (OSA), a chronic condition caused by periodic collapse of the pharynx during sleep. However, considering the non-compliance of patients and the consequences of untreated sleep apnoea, an alternative treatment method needs to be developed. Indeed, neuromuscular stimulation devices as a novel approach have recently become increasingly popular as an important and life-improving alternative. This study aimed to identify the appropriate site to optimize the implantation of neuromuscular stimulation devices.
Methods: The bilateral hypoglossal nerve (HGN) of eight cadavers was evaluated in the study. The distal branches of each HGN to the hyoglossus, geniohyoid and genioglossus muscles (GG) were examined and localized using a precision digital calliper. Distance from the cervical midline and distance from the symphysis to the mandible were assessed to measure localization. Moreover, anthropometric measurements were performed to assess other factors that may contribute to OSA.
Results: This anatomical study evaluated the location of the HGN and its terminal branches innervating the hyoglossus, geniohyoid, and genioglossus muscles. The appropriate area for positioning neuromuscular stimulation devices and associated risks were evaluated. The appropriate placement of the neuromuscular stimulation device was determined to be 20±2 mm in the midline and 50±6 mm in the symphysis mandible.
Conclusion: OSA, an increasingly prevalent disease, and the standardization of necessary treatment modalities are of vital importance. Drawing from the experiences gained in previous studies, an appropriate area was determined for neuromuscular stimulation devices. This provides a convenient option for patients who are non-compliant with CPAP devices, offering an alternative treatment approach.

Key words: Obstructive sleep apnoea, hypoglossal nerve, genioglossal muscle, neuromuscular stimulation devices