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CASE REPORT

Intraoperative identification of the human communicating nerve during thyroidectomy

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Abstract

The human communicating nerve (HCN) is a connection between the superior and recurrent laryngeal nerves that has been described in cadaveric studies. We report a case of an extralaryngeal variant of the HCN that was identified and stimulated intraoperatively during thyroidectomy. This appears to be the first case of intraoperative identification of this anatomic variant, of which the functional significance remains unclear.

INTRODUCTION

The basic description of laryngeal innervation involves the superior laryngeal nerve (SLN) providing ipsilateral sensory innervation to the supraglottis and motor innervation to the cricothyroid muscle, while the recurrent laryngeal nerve (RLN) provides sensory and motor innervation to all other laryngeal structures. However, anatomic studies suggest that there is significant overlap of motor and sensory innervation among branches of these nerves. Cadaveric studies of human larynges suggest a high prevalence of anastomoses between the internal and external branches of the SLN; between the internal branch of the SLN and the RLN, known in some instances as Galen’s anastomosis; and finally, between the external branch of the SLN and the RLN, which has been termed the human communicating nerve (HCN) [1-3]. While cadaveric dissection studies have illustrated the complexity and prevalence of these nerve connections, their impact on laryngeal function is not well understood. Visualization of these nerve anastomoses in intact, non-dissected larynges is challenging. To our knowledge, intraoperative identification and electrostimulation of the HCN have not been previously described. We report a case where an extralaryngeal variant of the HCN was identified and stimulated during routine thyroidectomy.

CASE REPORT

The patient was a 56-year-old woman with an incidentally noted, 1.1 cm right thyroid nodule. The nodule had microcalcifications,
The presence of the HCN in 44% of human larynges suggests that it contributes to thyroarytenoid muscle function. These studies suggest that the presence of the HCN may be relatively common, though most of these anastomoses occur within the larynx. Outside of cadaveric studies, intraoperative identification of an extralaryngeal HCN has not been described. This is likely related to the tendency of most surgeons to avoid, rather than identify, the EBSLN during thyroidectomy and other central neck surgeries. However, recent literature suggests that routine identification of the EBSLN using loupe magnification and intraoperative neuromonitoring may decrease occult EBSLN injury and improve postoperative voice outcomes.

The functional significance of the HCN is unclear. It has been suggested that the HCN may be the vestigial nerve of the fifth branchial arch, which has not been identified by anatomists. Some authors have also speculated that the presence of the HCN and other nervous anastomoses within the larynx might explain the variability in position of a paralyzed vocal fold following complete injury or transection of the RLN. Intraoperative identification of this variant is rare, since most of the anastomoses occur within the larynx. Newer practice guidelines advocating for the routine identification of the SLN during thyroidectomy may lead to intraoperative...
Figure 2: Stimulation of the HCN with the Dragonfly neuromonitoring system at 0.5 mA demonstrated a distinct waveform (A), with an onset latency of 3.2 ms and a peak-to-peak amplitude of 882.1 µV. This waveform was distinct from those produced by stimulation of the proximal RLN (B) or EBSLN (C). Note different scales used to best depict each of the responses.

identification of more examples of this extralaryngeal variant of the HCN.

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CONFLICT OF INTEREST STATEMENT
None declared.

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