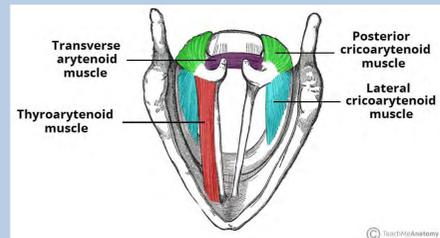


What is the Laryngeal adductor reflex? (LAR)

Is a protective reflex that prevents aspiration by causing vocal fold closure.

(Sasaki and Suzuki, 1976)



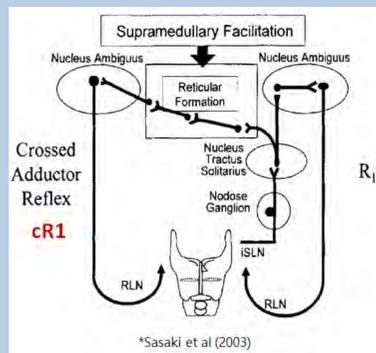
Is a Vago-vagal brainstem reflex

Afferent pathway:
Supraglottic mucosa

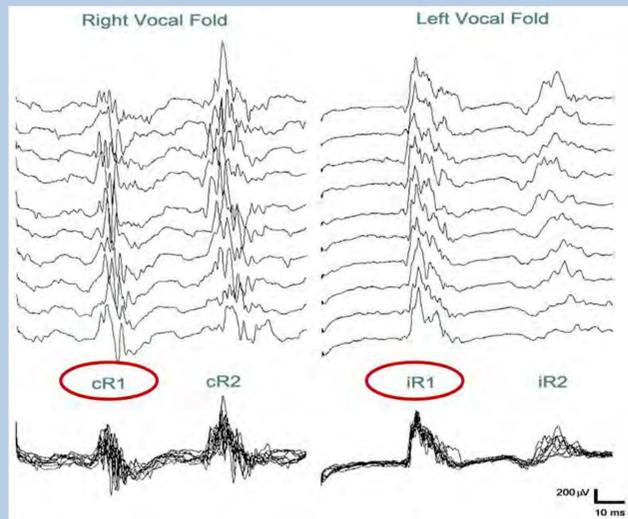
Internal branch of the superior laryngeal nerve

Brainstem pathway:
Nucleus of the Solitary tract
Nucleus Ambiguus.

Efferent pathway:
Recurrent laryngeal nerve



Is bilateral and stable under Total Intra Venous Anesthesia (TIVA)



Stimulation:

Bipolar concentric probe
Left Mucosa 20mA

Recording:

Hook-wires electrodes
Right/Left Thyroarytenoid muscles

The laryngeal adductor reflex is a new methodology for monitoring thyroid surgeries that may predict long term outcome of vocal fold function

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Methodology

This non-invasive, tube-based methodology has been developed to monitor the recurrent laryngeal nerve during thyroid surgeries (Sinclair et al., 2017). However, it can be used to monitor the Vagus nerve and its brainstem related structures, as well.



Nerve Integrity Monitor TriVantage endotracheal tube. (NIM TriVantage™, Medtronic Xomed Inc.)

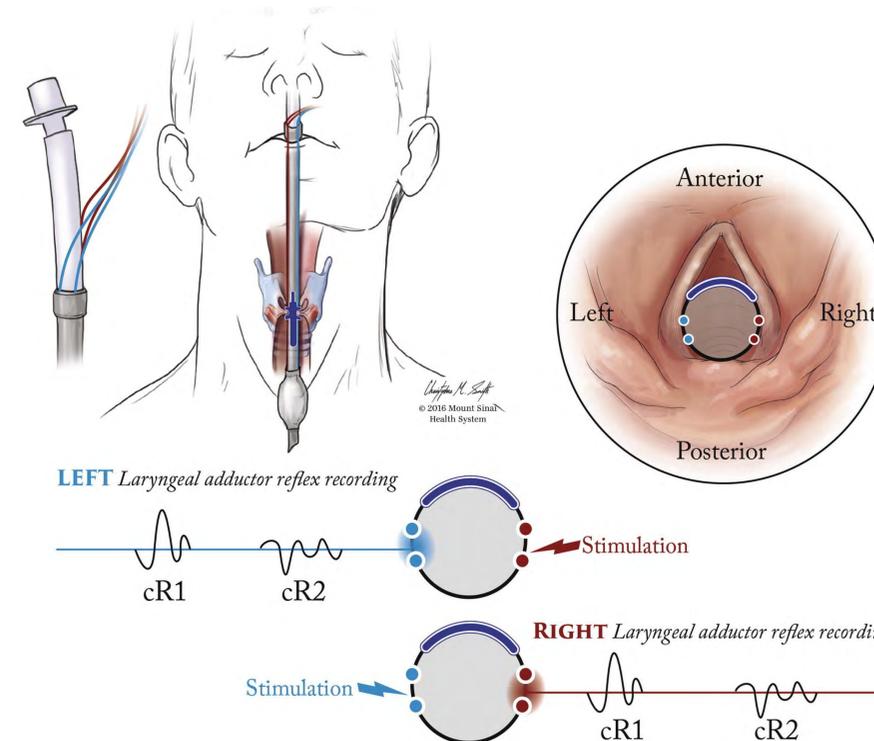
Vocal fold mucosa is electrically stimulated to elicit a short latency R1 response (R1-LAR) using endotracheal tube based electrodes.

Contralateral R1 responses are recorded using the endotracheal tube electrode contralateral to the stimulating electrode.

Right/Left LAR on the basis of the *Recording side* (cR1).

Limitations:

Tube movement
Far-field recording



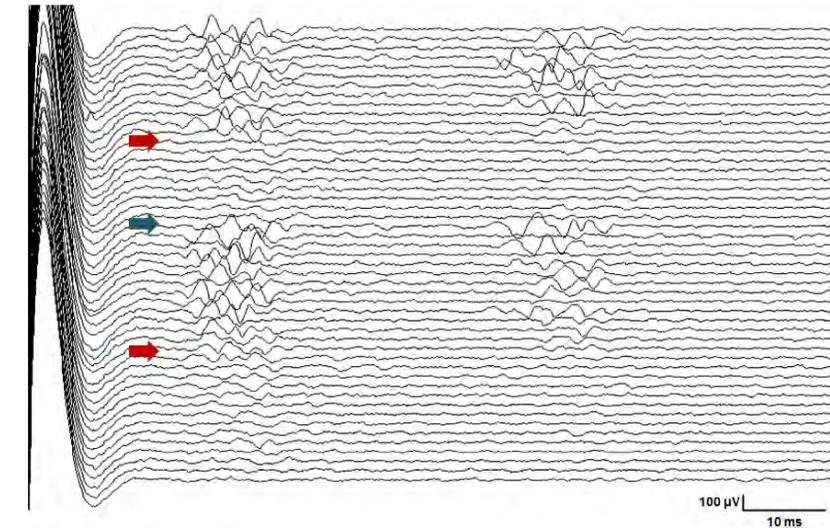
References:

Sasaki CT, Suzuki M. Laryngeal reflexes in cat, dog, and man. Arch Otolaryngol 1976;102:400-402.
Sasaki CT, Jassin B, Kim YH, Hundal J, Rosenblatt W, Ross DA. Central facilitation of the glottic closure reflex in humans. Ann Otol Rhinol Laryngol 2003;112:293-297
Sinclair CF, Téllez MJ, Tapia OR, Ulkatan S, Deletis V. A novel methodology for assessing laryngeal and vagus nerve integrity in patients under general anesthesia. Clinical Neurophysiology 128 (2017) 1399-1405

Clinical cases

Mechanisms of RLN injury during thyroid surgeries include: traction (stretching), heat injury and nerve transection.

The amplitude of the LAR frequently decreases with surgical maneuvers that put traction on the RLN and are reversible upon releasing the stretched tissue.

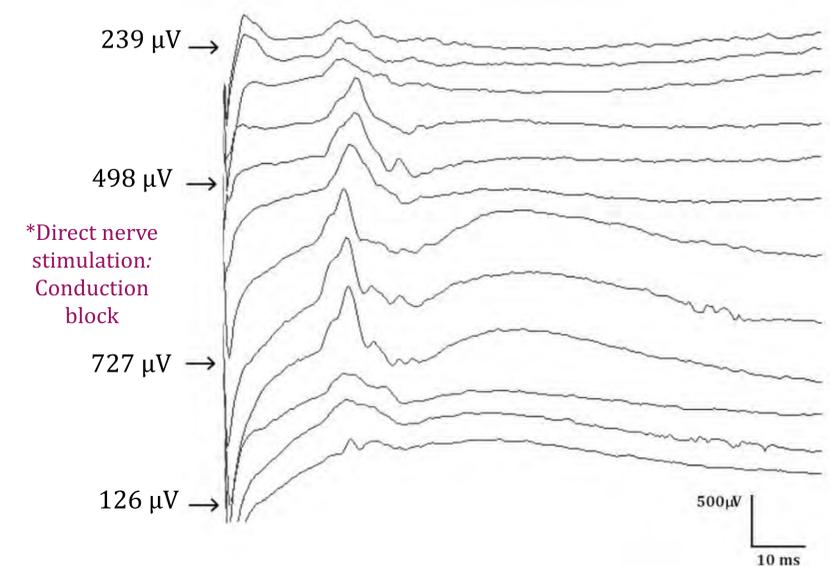


Patient 1: Traction

Female 68 y/o underwent right lobe thyroidectomy for a large benign nodule. Normal pre-operative laryngeal examination.

Outcome:

Vocal fold paralysis. She recovered baseline laryngeal function by 6 weeks.



Patient 2: Vascular event (?) during nerve dissection

Female 57 y/o underwent left lobe thyroidectomy due to posteriorly located thyroid carcinoma. Pre-operative vocal cord paresis.

Short period of reflex hyper excitability.

Outcome:

Vocal fold paralysis. Ten months post-op the cord mobility has not returned to normal.

Conclusions

1. The LAR is a new tube-based methodology for monitoring the RLN during thyroid surgeries or other surgeries where the Vagus nerve is at risk.
2. The LAR behavior during thyroid surgeries may predict long term outcome of vocal function.

