

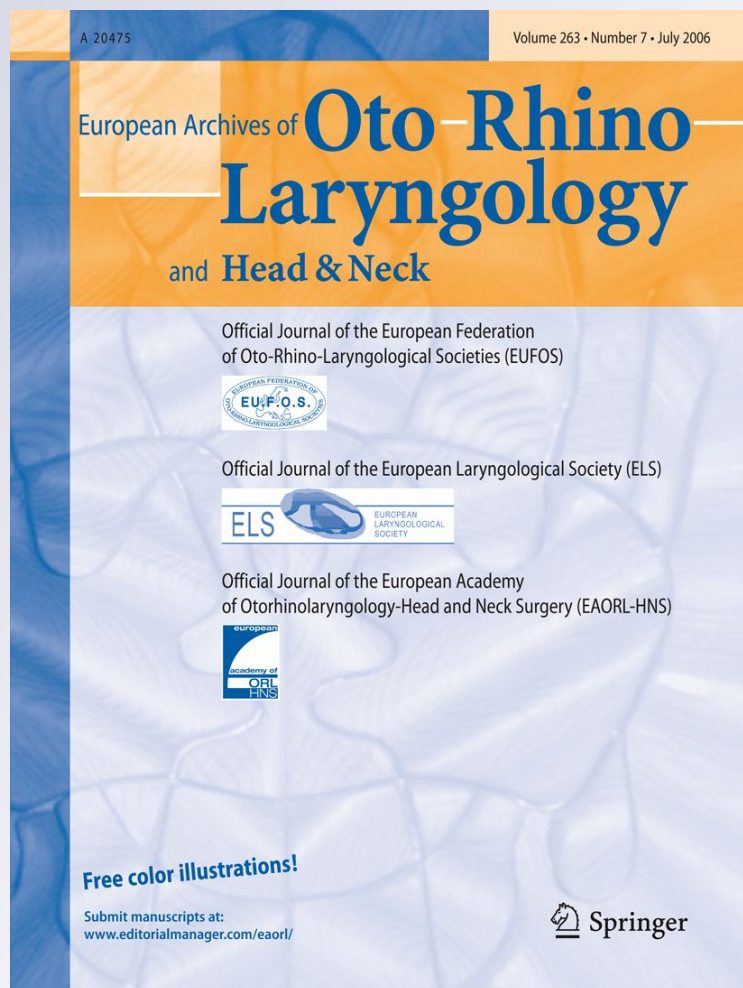
Vagal versus recurrent laryngeal nerve monitoring in thyroid surgery

Petros V. Vlastarakos, Bruno Kenway & George Mochloulis

European Archives of Oto-Rhino-Laryngology
and Head & Neck

ISSN 0937-4477
Volume 269
Number 4

Eur Arch Otorhinolaryngol (2012)
269:1305-1306
DOI 10.1007/s00405-011-1913-3



Your article is protected by copyright and all rights are held exclusively by Springer-Verlag. This e-offprint is for personal use only and shall not be self-archived in electronic repositories. If you wish to self-archive your work, please use the accepted author's version for posting to your own website or your institution's repository. You may further deposit the accepted author's version on a funder's repository at a funder's request, provided it is not made publicly available until 12 months after publication.

Vagal versus recurrent laryngeal nerve monitoring in thyroid surgery

Petros V. Vlastarakos · Bruno Kenway ·
George Mochloulis

Received: 15 December 2011 / Accepted: 27 December 2011 / Published online: 8 January 2012
© Springer-Verlag 2012

Dear Sir,

Recurrent laryngeal nerve (RLN) palsy is considered a serious complication of thyroid surgery. Permanent lesions are still occurring in about 1% of patients, despite the standardized surgical approach to the nerve, and the availability of RLN monitoring [1].

Intraoperative RLN monitoring is based on the visual or acoustic registration of evoked electromyography of the laryngeal muscles. Primarily, it proves conductivity of the stimulated nerve segment towards the muscle. However, a recent meta-analysis did not demonstrate a statistically significant difference in the rate of transient or persistent vocal cord palsy after using intraoperative neuromonitoring versus RLN identification alone during thyroidectomy [2], confirming the anecdotal views of many experienced thyroid surgeons on this issue. In addition, following an iatrogenic lesion of the RLN in a porcine model, the distal nerve segment showed unchanged amplitude of the electrophysiological response for an observational period of more than 1 h [1], thus revealing a potential pitfall for the neuromuscular monitoring of the RLN in the human surgical setting; the false assumption of an anatomically intact nerve even after transection.

Newly developed vagal stimulation probes permit continuous intraoperative neuromonitoring of the RLN during thyroid surgery. We had recently performed a hemithyroidectomy for a pedunculated right thyroid lobe lesion, which

was preoperatively classified as THY 2 with groups of follicular thyrocytes on U/S-guided FNA. During the operation a monitoring probe was attached onto the right vagal nerve (Fig. 1). In detail, after identification of the right carotid sheath medial to the right sternomastoid muscle, the omohyoid was divided, and the vagus nerve accessed, behind and lateral to the internal jugular vein.

The monitoring system was the NIM[®]-Response 3.0 (Medtronic Inc.), which uses the automatic periodic stimulation (APS[™]) electrode. The obtained waveform amplitude (the amount of current going through the nerve) was 111 μ V, and was above the standard amplitude setting of 103 μ V, according to the manufacturer's instructions. The system is designed in such a manner that a decrease of 50% in nerve conduction, which is shown as an amplitude drop below the level of 50 μ V, sets off an alarm (Fig. 2).

In the presented case, the alarm was indeed set off intraoperatively before the visual identification of the right RLN (Fig. 2), indicating related strain, however, the standard RLN probing (also incorporated to the system) after the

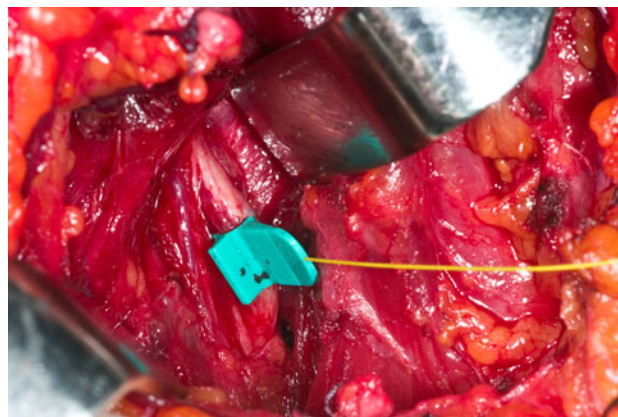


Fig. 1 Vagus monitoring probe attached onto the right vagus nerve

P. V. Vlastarakos (✉) · B. Kenway · G. Mochloulis
ENT Department, Lister Hospital, Coreys Mill Lane,
Stevenage, Hertfordshire SG1 4AB, UK
e-mail: pevlast@hotmail.com; pevlast@yahoo.gr

P. V. Vlastarakos
33 Wetherby Close, Stevenage, Hertfordshire SG1 5RX, UK

Fig. 2 The NIM[®]-Response 3.0 in the APS[™] setting. Please notice the recorded “event” (yellow circle), as opposed to the neural activity prior to the “event” (big screen)



visual identification of the nerve, was suggestive of an intact RLN. Unfortunately, the patient developed a postoperative right vocal cord palsy, which was confirmed by flexible naso-endoscopy. The palsy was present in the first follow-up appointment, where the histology result, which was suggestive of a diffuse sclerosing variant of papillary carcinoma, was presented to the patient, and a completion thyroidectomy was suggested. The implications of the latter for both the patient and the operating surgeon can be easily conceived.

RLN injuries remain a source of concern to both surgeons and patients, and a cause of malpractice litigations [3]. In addition to the appropriate surgical training, the continuous intraoperative neuromonitoring allows an immediate problem solving reaction of the surgeon in cases of signal loss [4], and may be helpful to the recognition of RLN injuries, and the prediction of RLN postoperative function. Standardization of the intraoperative neuromonitoring technique, and comparison of the sensitivity and cost-effectiveness of vagal versus standard RLN monitoring in larger patient series is required before this technology is applied in everyday surgical practice. Such a study has already obtained ethical approval, and is currently underway in our Department.

Acknowledgments The authors thank Mr. Melvin Bond, from the Department of Clinical Photography and Illustration at Lister Hospital, for providing the photographs of the patient and monitoring system.

Conflict of interest The authors have no conflict of interest, and have not received any financial support for this article. The patient had signed a consent form regarding the publication of her intra-operative photographs for educational or other purposes

References

- Birkholz T, Irouschek A, Labahn D, Klein P, Schmidt J (2010) Electromyographic response persists after peripheral transection: endorsement of current concepts in recurrent laryngeal nerve monitoring in a porcine model. *Langenbecks Arch Surg* 395(2):121–125
- Higgins TS, Gupta R, Ketcham AS, Sataloff RT, Wadsworth JT, Sinacori JT (2011) Recurrent laryngeal nerve monitoring versus identification alone on post-thyroidectomy true vocal fold palsy: a meta-analysis. *Laryngoscope* 121(5):1009–1017
- Abadin SS, Kaplan EL, Angelos P (2010) Malpractice litigation after thyroid surgery: the role of recurrent laryngeal nerve injuries, 1989–2009. *Surgery* 148(4):718–722 (discussion 722–3)
- Jonas J (2010) Signal evaluation of continuous vagal nerve stimulation for recurrent laryngeal nerve protection in thyroid surgery. *Zentralbl Chir* 135(3):262–266 (article in German)