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LETTER TO THE EDITOR

Safety of Continuous Intraoperative Neuromonitoring (C-IONM) in Thyroid Surgery

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Terris [1] reported nine cases operated with continuous neuromonitoring (CIONM). We are concerned with some of aspects reported. Several hundred cases of CIONM have been published without reporting related side effects [2]. The anesthesia description is not precisely presented. Which anesthetic protocol was used during induction and maintenance? How was the depth of anesthesia measured? What was the pharmacological approach to treating the effects on autonomic nervous system (ANS)? ANS alterations are frequently encountered but unrelated to vagal stimulation [3]. The use of continuous propofol infusion reduces blood pressure and parasympathetic tone in direct proportion to the depth of anesthesia, while sevoflurane use exerts only minor effects on the parasympathetic tone [3]. Greater parasympathetic tone in case of bispectral index values >50 is expected with propofol and bradyarrhytmias may occur [3]. Totally intravenous anesthesia technique with opioids influences the autonomic heart rate response [3]. Sevoflurane effects on the nervous system are characterized by an overall reduction in activity of the sympathetic and parasympathetic nervous system, without "imbalance" between the two components of the ANS [3]. With these overwhelming influences, it is difficult to implicate CIONM. The hemodynamic instability described in 2nd complication is difficult to clearly be attributable to a vagal reaction to anesthesia or vagal nerve (VN) manipulation or CIONM stimulation. Figure 3 shows heart rate reaction at "APS off" not at "APS on," text is discrepant [1].

Repetitive, chronic VN stimulation is routinely used in the cure of refractory epilepsy [4]. During implantation, test-stimulation is performed with stimulation parameters

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of 1.0 mA, 500 μs, 20 Hz, 30 s to ensure proper function. Incidence of ventricular asystole is 0.1 %, an estimate dating back to 2000 based on 4600 implants [4]. Stimulation frequencies used for treatment of epilepsy are distinctly higher than pulse rate 2 s applied for CIONM [4]. To assess VN stimulation-induced effects on the ANS, the heart rate variability analysis (HRVA) was applied [5]. Supramaximal currents ranged from 0.5 to 5 mA, pulse width 200 s, pulse rate 2 s. HRVA revealed a increased vagal activity during CIONM. This parasympathetic predominance was not countered by sympathetic nervous system. Despite a increase of vagal tone, no hemodynamic events occurred, no significant changes in median heart rate or arterial blood pressure were detected [5].

Description of surgical approach to the carotid sheath, VN dissection technique, CIONM probe positioning/removal may be valuable to understand 1st complication. Which were the options for dissection and controlling haemostasis during this stage? Where any monopolar/bipolar instruments excluded in this stage to prevent thermal injury? How VN handle was carried out? A description for baseline V1/V2EMG responses are defective.

Defining CIONM "a backward step" toward a greater safety is premature [1]. According to published papers, CIONM appears to be a technological improvement [2]. The requirement of 360° VN dissection is an impediment for a wide adoption. Some surgeons may perceive this dissection places the VN at risk. A surgeon who operates on the thyroid gland needs to handle carefully many anatomic structures. The placement of the C-IONM electrode is not difficult [2].

Compliance with ethical standards

Conflict of interest The authors have no conflict of interest to disclosure, no other funding or financial relationship with Surgical Industry.

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