Mechanomyography of intrinsic laryngeal muscles in Göttingen minipigs

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Introduction: A pressure-measuring device (PMD) was developed for mechanomyography of intrinsic laryngeal muscles (LAR).

Methods: Physical properties of PMD (saline-filled PVC balloon glued to a plastic tube): 1) pressure-volume-curves (dp/dV), 2) pressure increase (dp) at 0.5 N (various preloads), 3) linearity (dp/F; F:0.02-8 N; various preloads), 4) resonance frequency. In vivo: 10 Göttingen minipigs (Animal Protection Commission consent). Methohexitone/fentanyl anesthesia; high-frequency ventilation via tracheostoma; mechanomyography of flexor digitorum muscle (FLEX) and LAR (single twitch stimulation, 0.1 Hz); onset and neuromuscular block (NMB) of individual EDOFLEX of vecuronium (VEC).

Results: 1) Linearity of dp/dV; 2) constant dp under 0.5 N; 3) linearity of dp/dF; 4) resonance frequency: 13±1.3 Hz.

In vivo: highly reliable, stable signal quality (12 hours).

Table: NMB and onset of EDOFLEX (0.203±0.0149 mg/kg VEC) at LAR and FLEX, M±pmSEM.

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<th>NMB [%]</th>
<th>Onset [s]</th>
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<tr>
<td>FLEX</td>
<td>90±1.0</td>
<td>160±11.0</td>
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<tr>
<td>LAR</td>
<td>84±2.2</td>
<td>136±7.0*</td>
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Conclusion: 1) The system is suitable for larynx muscle mechanomyography due to its physical properties and reliable signal quality. 2) Pharmaceutically, Göttingen minipig laryngeal muscles resemble those of man (1).


Using the World-Wide Web for the interactive simulation of the anesthesia machine

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Introduction: Instead of consulting textbooks, manuals or reference sources computer simulation of respirator function has established as a common pathway in visualizing the interaction of respirator function and lung mechanics. Moreover, the World-Wide Web (WWW) is capable of easily distributing this simulation via the Internet by using the program language Java instead of specialized software.

Methods: Approaching a flexible analogy model to ventilation by means of computer simulation attention commonly is directed to an electrical equivalent circuit as a standard of excellence that contains essential features denoting properties of the pulmonary system when ventilated and different respirator settings. Applying equations of state and equations of output to appropriately solve the differential equations provides the most suitable method. These equations then constitute the kernel of the computer simulation by using the program language Java. The model of ventilation we implemented permits real-time simulation and to interactively change pulmonary parameters and respirator settings. The simulation can be received via the Internet and then runs by simply using a WWW browser.

Results: Fuzzy-KBWean is based on Delphi®, running on a WindowsNT® platform, stores all data in a database and is used in an intensive care unit (ICU) for post-operative cardiac patients at the Vienna General Hospital. The application is in a prototype stage and is currently being tested. The system is fully designed and represents an excellent paradigm for weaning post-operative patients, because expert knowledge about the problem has been utilized.

Conclusion: The ultimate aim is to grasp the trends in the field of weaning in order to design a closed loop system.