MicroNEP
A simple test for measuring Expiratory Airways Flow Limitation (EAFL)
MicroNEP

Expiratory Airways Flow Limitation measurement using Negative Expiratory Pressure (NEP)

Introduction

With the addition of the Negative Expiratory Pressure (NEP) software module, MicroRint transducer, and a negative pressure generator, the SuperSpiro spirometer is equipped to take measurements of Expiratory Airways Flow Limitation (EAFL).

The method, which is technique and effort independent, uses negative applied pressure during passive expiration to detect EAFL (as described in 1994 by J. Milic Emili et al). The test requires minimal subject cooperation and can be carried out during spontaneous breathing.

This technique has been used to measure EAFL in numerous conditions known to affect the respiratory system, but is particularly useful in categorising the degree of EAFL in patients with severe COPD for whom Spirometry is either too difficult or can give misleading results.

Although this method has been known for some years, Micro Medical are the first to commercialise EAFL measurement using NEP in a portable, economic format. EAFL measurement is useful in both clinical and research applications.

MicroNEP Features

- Non-invasive, simple and fast to use
- Effort and technique independent method
- Large results memory
- Results up-loadable into PC software package (included)
- Inbuilt bacterial/viral filter system
- Portable system (allowing bedside and domiciliary testing)
- Configurable testing and analysis protocol
- TrueVGA colour display
- High performance built-in printer
- Full professional grade Spirometry and Bronchial Challenge included
- MicroRint airways resistance measurement included
Normal airways – no co-incidence of the tidal curves, with and without NEP applied

Classification of EAFL into 5 categories according to percentage control tidal volume and body position (after L. Eltayara et al. 1996)

<table>
<thead>
<tr>
<th>Supine</th>
<th>Seated</th>
<th>Category</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>No EAFL</td>
<td>No EAFL</td>
<td>0</td>
<td>None</td>
</tr>
<tr>
<td>EAFL &lt;50%/Vt</td>
<td>No EAFL</td>
<td>1</td>
<td>Mild</td>
</tr>
<tr>
<td>EAFL &gt;50%/Vt</td>
<td>No EAFL</td>
<td>2</td>
<td>Moderate</td>
</tr>
<tr>
<td>EAFL</td>
<td>EAFL &lt;50%/Vt</td>
<td>3</td>
<td>Severe</td>
</tr>
<tr>
<td>EAFL</td>
<td>EAFL &gt;50%/Vt</td>
<td>4</td>
<td>Very severe</td>
</tr>
</tbody>
</table>

Technique

The basis of the measurement is that during spontaneous breathing a small negative pressure is applied at the start of expiration. In normal subjects an increase in expiratory flow is observed. In subjects with EAFL there will only be a partial increase in expiratory flow.

This effect is observed by overlaying the flow-volume curve with NEP applied with the previous tidal expiration with no NEP applied. The amount of EAFL can be quantified as the percentage of the original tidal volume remaining when the two curves first became co-incident. This may be further classified by considering the amount of EAFL whilst both seated and supine (laying flat).

Importantly, EAFL has been shown to correlate more closely with chronic dyspnea in COPD patients than conventional measures of airway obstruction (e.g. FEV1).
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Specifications

Measurement
Expiratory Airways Flow Limitation as a percentage of the control tidal volume.

Reporting
Expiratory Airways Flow Limitation classification after L. Eltayara et al.

Storage
Up to 300 tests.

Transducer (N EP and Rint)
Micro Medical MicroRint transducer.

Resolution
10ml/s flow, 1Pa pressure.

Accuracy (Rint)
+/-3% for flow and pressure.

Transducer dimensions (Rint)
160x65x40mm.

Transducer weight (Rint)
400g.

Oclusions per test
1-15.

SuperSpiro Display
VGA Colour LCD.

Transducer (Spirometry)
Micro Medical Bi-Directional Digital Volume.

Resolution (Spirometry)
10ml volume 0.03l/s flow.

Accuracy (Spirometry)
+/-3% (To ATS recommendations - Standardisation of Spirometry 1994 update for flows and volumes).

Printer Type
320 dot per line thermal printer.

Power supply
Input 100 to 250V, 50 to 60Hz.

Output
12V 500mA, 5V 5A (Class 1 equipment).

Dimensions (Spirometry)
337x140x45mm. Transducer 50x60x90mm.

Weight (Spirometry)
1.1kg. 2.6kg with carry case and accessories.

Negative pressure generator dimensions
140x170x230mm.

Negative pressure generator weight
1.1kg.

Operating Temperature
+15°C to +25°C.

Operating Humidity
30% to 90% RH.

Storage Temperature
-20°C to + 70°C.

Storage Humidity
10% to 90% RH.

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The MicroNEP, MicroRint and SuperSpiro are part of an extensive range of respiratory measurement equipment manufactured by Micro Medical Ltd and are offered as an equipment (Cat.no. NEP 6000) Negative Expiratory Pressure system for use with SuperSpiro (Cat.no. SU6000) comprising self contained pressure generator, MicroRint transducer and all necessary accessories.

Micro Medical Ltd pursues a policy of continuing improvement in design, production and performance of its products. The right is therefore reserved to vary details at any time and without notice.

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