INFLUENCE OF PRONE POSITION IN EXTRACORPOREAL CARBON DIOXIDE REMOVAL DEVICE FUNCTION

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INTRODUCTION: What is the Novalung®?

- Pumpless device.
- CO2 eliminated by peripheral arteriovenous shunt.
- Helps reduce ventilatory parameters.
- Protective ventilation.
- Lung rest.
- Decreases damage associated with mechanical ventilation.

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INTRODUCTION: How it works

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AIMS

- Discover Novalung® effect on ventilation taking into account the patient’s prone position versus supine position.
- Describe evolution and specific care of a patient with Novalung®.

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MATERIALS AND METHODS

- Cross-sectional study of a clinical case.
- Context: intensive care unit of a tertiary hospital.
- Variables analyzed: haemodinamic, respiratory, nutritional and metabolics parameters, BIS, days and drugs doses, cephalin time, Novalung® O2 and blood flow, position and length of prone cycles.
- Statistical tests: ANOVA, t Student, Wilconxon-Mann Witney and Spearman correlation.
- Significance p<0,05.

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DESCRIPTION

- 46 years old woman.

Reason for admission:
- Severe ARF with ARDS criteria.
- Nosocomial pneumonia.
- Broncopleural fistulae.

Novalung® indication to optimize management ventilatory and remove CO2.

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CARDIOVASCULAR

<table>
<thead>
<tr>
<th>MAP (mmHg)</th>
<th>HR (l/min)</th>
<th>CI (L/min/m²)</th>
<th>VVS (%)</th>
<th>RVSI (dyn<em>sg</em>m²*cm⁵)</th>
<th>ELWI (ml/Kg)</th>
<th>GEDI (ml/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>82±9</td>
<td>110±6</td>
<td>3,2±0,8</td>
<td>14±4</td>
<td>1627±264</td>
<td>33±4</td>
<td>658±142</td>
</tr>
</tbody>
</table>

- Norepinephrine 0,68±0,79 µg/kg/min 15 days.
- Dobutamine 2,22 µg/kg/min 3 days.
- CVVHF 13,2 days, median extraction 50cc/h, 8 days in prone position.

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RESPIRATORY

<table>
<thead>
<tr>
<th></th>
<th>With Novalung ®</th>
<th>Without Novalung ®</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vt (cc)</td>
<td>267±72</td>
<td>512±67</td>
<td>0,0001</td>
</tr>
<tr>
<td>PC (cmH₂O)</td>
<td>17±3</td>
<td>30±1</td>
<td>0,0001</td>
</tr>
<tr>
<td>PEEP(cmH₂O)</td>
<td>10±2</td>
<td>15±2</td>
<td>0,0001</td>
</tr>
<tr>
<td>PaCO2 (mmHg)</td>
<td>56±9</td>
<td>66±21</td>
<td>0,005</td>
</tr>
</tbody>
</table>

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PRONE POSITION

- 4 prone cycles, mean duration 53±27 hs.
- The last cycle was with Novalung® for 96 hs.

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PRONE POSITION

- Blood flow supine/prone: 1053±82 vs 113±112cc/min p=0.001.
NOVALUNG® CARE

- Inserted at 13 days of admission in ICU.
- Duration 12 days.
- Femoral arterial and venous catheter 13 and 15 Fr.
- Increase of O2 flow to 14l/min.
- Heparin sodium infusion 0,18±0,14UI/Kg/min
- APTT de 57,56±16,41 sec.

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NOVALUNG® CARE

- Hemodynamic monitoring, MAP>60mmHg
- Pedal pulse, tibial pulse and temperature of lower limbs monitoring.
- Femoral arterial and venous catheter care.
NOVALUNG® CARE

- Monitor connection settings, presence of clots, performance and integrity of the device.
- Detect early sings of bleeding.

13º día
Retirado cara venosa
Retirado cara arterial

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EN 22 days was well tolerated, even in the prone position.

- Blood glucose 144±33mg/dl, insuline 0,71±0,27 UI/kg/min.
- Pressure ulcer measuring 1x2cm in groin area.
- Flexi-seal® tube in the last prone cycle.
NEUROLOGIC

- Deep sedation.
- BIS 44±10.
- Midazolam 7,24±2,9 µg/kg/min.
- Morphine 0,71±0,27 µg/kg/min.
- Cisatracurium 5,3±0,95 µg/kg/min.

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CONCLUSIONS

- The device’s small size allowed for a successful prone technique without complications.
- Able to apply a protective ventilation with normocapnia and without alterations of blood pH.
- The device blood flow decreased significantly in the prone position, but this decrease did not affect the funcionality of Novalung® with increasing O2 flow.
BIBLIOGRAPHY


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Many Thanks