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Assistance to neuromuscular patients in NIV – Non-Invasive-Ventilation in the hospital environment

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Noninvasive ventilation is the most effective ventilatory support for maintaining the life of neuromuscular patients. Many use the equipment 24 hours a day, with ventilatory support being the only way to promote lung capacity.

Little has been said about how professionals should proceed in case of breathing difficulties and suspected COVID infection 19.

Some doubts are emerging in emergency care about what is the best strategy for emergency care

For neuromuscular patients.

There are no specific studies on the effects of NIV on the neuromuscular patient with COVID 19 and we know that the only strategy to improve oxygenation in severe cases is invasive ventilation through orotracheal intubation.

The attempt to maintain NIV in the neuromuscular patient is the great challenge in this pandemic moment.

Some instructions regarding the use of NIV must be taken into account. NIV should not be used as a ventilatory support in places where close monitoring is not possible. In China, the use of NIV caused delayed intubation and increased mortality.



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The Brazilian Society of Pulmonology advises that NIV should be used only as a bridge for invasive ventilation, especially in places where intubation can be immediate. We know that the biggest contraindication concerns the amount of aerosol dispersed in the air due to the open system of the mask and the exhalation valve.

Guidelines for NIV-dependent neuromuscular patients:

1) In emergency care units

a) Patients using NIV through non-invasive ventilatory support with a single branch:

- Do not keep in nasal mask, make the immediate change to non-ventilated, performax or oronasal mask;
- Make the switch to dual circuit in the respirator or circuit with active valve present in the life support respirators;
- Be careful with escape valves, as these are the most suitable places for aerosols.

b) Circuits with single branch and active expiration valve:

- Use the filter in the correct sequence: non-ventilated mask / bacterial HMEF filter / circuit with active valve / bacteriological filter / respirator;
- Recognize the circuit after assembly, due to the various resistances caused by the filters;



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- Connect the oxygen to the back of the respirator (specific entrance port), and should not be placed near the mask.

c) Microprocessed respirators or dual circuit life support respirators:

- Place the filters following the following sequence: non-ventilated mask / HMEF filter / double circuit / respirator;

(The safety of NIV in these respirators is greater and, therefore, there is a greater chance of success in the ventilatory strategy).

2) Ventilation and oxygenation strategies suggested for neuromuscular patients in the hospital environment

a) The method of choice should be Pressure Controlled (PCV), as it allows for small leaks;

b) The recommendations of invasive ventilation strategies should be followed in NIV:

- Protective ventilation

- low EPAP to avoid hyperdistension;

- Minimum pressure delta (IPAP-EPAP), sufficient to guarantee a lower PCO₂, acceptable in neuromuscular patients (10ml / kg);

- Permissive hypoxemia - Target SPO₂ of 93% (ranging from 90 to 95%);



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- Avoid hyperoxia - SPO₂ greater than 96%;

3) Signs of NIV bankruptcy

- a) FR greater than 25 irpm;
- b) Altered breathing pattern - intercostal circulation and sternal wishbone retraction;
- c) Tracheal auscultation with obstruction;
- d) Need for EPAP greater than 10 cm / H₂O to maintain oxygenation;
- e) Need for more than 5 l of oxygen to maintain 90% saturation;

Note: Minute Volume (MV) and Tidal Volume (VT) should not be used as parameters due to the increased thoracic compliance of neuromuscular patients, noting that they already use MV greater than 10 l / min and VT of 10 ml / kg.

4) Strategy using HELMET

The use of helmet ventilation (Helmet) is contraindicated in neuromuscular patients. The strategy used through this device is CPAP, favoring the pressurization of the respiratory system.

It is essential to emphasize that the neuromuscular patient needs ventilatory support and CPAP is totally contraindicated

Interfaces for noninvasive ventilation. Top (left to right): nasal mask, nasal pillows, oronasal mask, hybrid mask. Bottom (left to right): oral mask, total face mask, helmet. (From Reference From Hess D 2013.)



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5) Important information:

- Intubation, in these cases, must be considered to avoid mortality;
- The neuromuscular patient must express his opinion on the performance of this procedure, which may cause the need for permanent tracheostomy;
- Neuromuscular patients should seek emergency care units only when they have symptoms characteristic of COVID-19.

Note: this text is for information purposes, and its use as a bibliographic reference is not allowed. The content is present in the Bibliography below.

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