

Pulmonary Support for Neuromuscular Disease Patients During COVID19 Pandemic

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BACKGROUND

- 1. Neuromuscular Disorders (NMD) can affect breathing function**
 - a. NMD do not in general damage lung tissue
 - Even NMD patients with weak muscles do not need supplemental oxygen when otherwise healthy
 - b. Impaired breathing in NMD is due to weak diaphragm and other breathing muscles
 - Breathing is supported with advanced positive airway pressure (PAP) devices including home ventilators, commonly known as noninvasive ventilation (NIV), via a mask interface. These are often used at night. During the daytime, some individuals may receive ventilation via a mouthpiece (sip ventilation).
 - Tracheostomy and a home ventilator are used when breathing muscles are very weak.
- 2. COVID19 can affect breathing function in all individuals, even if their muscles are strong**
 - a. COVID19 does not directly affect breathing muscles, but inflames lung tissue
 - Oxygen has greater difficulty moving through the lung in COVID19
 - COVID19 patients with low oxygen benefit from supplemental oxygen

CONCERNS RAISED BY COVID19 REGARDING BREATHING SUPPORT IN NEUROMUSCULAR DISORDERS

- 1. NMD patients with COVID19 will require both PAP ventilation (NIV or intubation) AND supplemental oxygen**
- 2. Typical NIV support in COVID19 can increase spread of viral particles to surroundings and infect others**
 - a. COVID19 is mainly spread through droplets produced by coughing or sneezing
 - b. NIV and airway clearance devices (cough assist, nebulizer) can “aerosolize” the COVID19 virus – spreading it much more widely
 - c. To reduce viral spread, most hospitals are discontinuing routine use of NIV and airway clearance devices
 - d. Home mask interfaces are vented and can blow virus out of the CO₂ exhalation ports, spreading the virus in the surrounding environment, as do masks with a high leak.
- 3. NIV devices for NMD patients with COVID19, can be modified to restrict viral spread, by:**
 - a. Removing the humidifier, and adding a combined bacterial/viral filter between a non-vented mask and the tubing.
 - b. Switching to a dual-lumen hose and non-vented full-face mask with a compatible ventilator



- Without venting, CO₂ can dangerously build up in the lungs
- A dual lumen hose allows CO₂ to be removed and limits spread of the virus
- Some new home ventilators (e.g. Philips EVO, ResMed Astral 150, VOCSN) have dual lumen capability

BREATHING SUPPORT OPTIONS FOR NEUROMUSCULAR DISEASE PATIENTS DURING COVID19 PANDEMIC

1. At home

- a. If there is **no** COVID19 exposure or infection
 - Continue usual breathing support and pulmonary care
 - Caregivers need to follow CDC guidelines closely: Wash hands, use ≥ 60% alcohol-based sanitizers, do not touch face, avoid contact with anyone possibly infected
- b. If there is evidence of COVID19 exposure or infection but breathing has not changed
 - Maintain close contact with providers to get detailed recommendations and updates to these guidelines
 - Institute changes to NIV outlined above, if possible
 - Increase protection of caregivers to reduce the risk of them being infected
 - Follow cleaning recommendations for equipment closely (also see ACCP guidelines)
 - Monitor oxygenation carefully, use home pulse oximeter if possible

2. Emergency department or hospital pulmonary care, if there is suspicion of COVID19

- a. NMD patients with COVID19 infection will require PAP support (NIV or intubation) and supplemental oxygen
- b. To decrease spread of COVID19 in the hospital, use of typical home PAP/NIV devices will not be allowed
- c. To avoid intubation, use a double-lumen compatible ventilator with an unvented, well-fitted full-face mask
- d. Severe pneumonia may necessitate intubation and ventilator support
- e. As hospital ventilators become scarce, specific home ventilators that are compatible with a dual-lumen hose (e.g. Trilogy 100, EVO, Astral 150, VOCSN) may be used, if hospital policy permits

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For more details see [American College of Chest Physicians (ACCP) Care Recommendations for the Home-Based Ventilation Patient Undergoing Therapy for Known or Suspected Respiratory Viral Infection with COVID-19]

<https://www.chestnet.org/Guidelines-and-Resources/Resources/CHEST-Novel-Coronavirus-Resources>

<https://foundation.chestnet.org/patient-education-resources/>

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