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Research in Action: Comparing ED Options for Non-Invasive Ventilation for COPD Patients with Hypercapnic Episodes: Bilevel Positive Airway Pressure (BiPap) Versus High Flow Nasal Cannula (HFNC)?

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Bilevel positive airway pressure (BiPap) and high flow nasal cannula (HFNC) are two different forms of non-invasive ventilation (NIV) used to treat acute hypercapnia in COPD patients. Both methods are used to help deliver oxygen to the lungs and to reduce the amount of carbon dioxide that is exhaled, but they differ in their mode of delivery and the level of pressure provided. Bipap is a form of NIV that utilizes a machine to deliver air to the patient through a mask. The machine has two levels of pressure, one for inspiration and one for expiration. The higher pressure during inspiration helps to open up the airways and make it easier for the patient to breathe. HFNC, on the other hand, delivers a high flow of oxygen through a nasal cannula.The device also humidifies the oxygen. Additionally, the device can deliver heated and humidified air which can help to reduce the work of breathing and increase the comfort of the patients. HFNC delivers heated, humidified oxygen at a flow rate, up to 60 L/min.

One of the main advantages of Bipap over HFNC is that it can provide a higher level of pressure support, which can be beneficial for patients who have more severe respiratory distress. On the other hand, the advantage of HFNC over Bipap is that it is less invasive, and it can be used in patients who have difficulty tolerating a mask. The interface is more comfortable and less claustrophobic for patients, which makes it an ideal option for patients who are agitated or combative. It is also less cumbersome and easier to set up, which can make it more convenient

for patients who need to be moved around frequently. HFNC can also deliver a maximum of 100% oxygen, and may be more reliable because the level of inspired oxygen is independent of the patient's breathing pattern. Currently, HFNC is being used as a first-line treatment for children and infants with respiratory distress.

The research comparing the two modes for COPD has not yet clarified which modality is better. Meta-analyses that evaluate studies of the use of BiPap and HFNC are largely inconclusive. Some studies support the idea that HFNC is a viable alternative to NIPPV, however, it is still unclear whether HFNC confers any advantages when compared to NIPPV. One study looked at COPD patients with severe acute exacerbation and found there was no difference in the 30 day intubation and mortality rate for patients treated with HFNC in comparison to NIPPV. Another study comparing 65 hypercapnic respiratory failure patients treated with either HFNC or NIPPV found similar intubation and treatment failure rates between the two groups. One study did find increased ventilatory support for 36 hypercapnic COPD patients when treated with HFNC compared to NIPPV, however, there are few studies to date with similar results.

A randomized controlled trial funded by Vapotherm is currently underway from several institutions, including George Washington University Hospital, Camden Hospital, University of Maryland, and others seeks to further evaluate the clinical efficacy of HFNC in comparison to NIPPV. Study participants with COPD who present with moderate-to-severe hypercapnic respiratory distress are assigned to either HFNC (the Vapotherm Precision Flow Plus) or NIPPV (the Philips Respironics V60) and efficacy is measured via several factors including perceived dyspnea, vital signs, patient communication stability, and blood gas. Through this clinical trial,

researchers hope to reveal whether HFNC is as effective as BiPapa for COPD-induced hypercapnia.

The author has no conflicts to report.