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COVID-19 Update FAQ's

As COVID-19 infections continue to increase questions continue to be raised. This is a list of frequently asked questions and answers regarding the use of Percussionaire products.

- Is it safe to use the VDR®4 ventilator with COVID-19 patients?
Yes. Please see our Whitepaper titled “Using High frequency Percussive Ventilation (HFPV) with Highly Infectious Patients”.

- Is there any published data on the use of high frequency percussive ventilation with COVID-19 patients?

Currently there has not been any peer reviewed published papers on the use of HFPV with COVID-19 (SARS-CoV-2) but many institutions that have frequently used the VDR®4 ventilator with other diseases are reporting positive results. Many of these same facilities did use HFPV with positive results in past pandemics such as SARS-CoV, and H1N1. In facilities that historically used the concept of having a moderate leak when using the VDR ventilator, many have switched to using the VDR without a leak to mitigate potential aerosolization and have reported good results. With the proper use of bacterial filters there is no contraindication to the use of HFPV with COVID-19 patients.

- If necessary, can I attach 2 patients to a VDR[®]4 ventilator?
Percussionaire does not endorse the use of a VDR[®]4 ventilator on 2 patients at the same time. Due to varying resistance and compliance of each patient, it would be extremely difficult to manage both patients safely and could possibly result in injury to healthy lung tissue.

- Can I use a helmet to ventilate a patient on the VDR[®]4 ventilator?
There has not be any published data on the use of a helmet with the VDR-4 ventilator but there is no contraindication to the use of one. The European Society of Intensive Care Medicine (ESICM) describes helmets as an “attractive option” due to their ability to “reduce exhaled air dispersion” but there is no documented safety or efficacy of their use with COVID-19 patients. Because of the high flow, one should frequently assess the patient for the potential of ocular dryness occurring.

- Can I use IPV therapy on a COVID-19 patient?
Yes, it is safe to use IPV therapy on these patients. Remember to wear proper PPE and ideally the patient should be in a negative pressure room. A bacterial filter can be placed on the expiratory port. If you are concerned that the patient might occasionally have a poor mouth seal during treatment and potential aerosolization of oral secretions, the use of a non-vented BiPAP/CPAP face mask or a mask similar to the type used with resuscitations bags can be used.

- Is there any published peer reviewed data on the use of IPV therapy with COVID-19 patients?
- Yes, the American Journal of Case Reports just published a report of 3 patients that were kept out of the ICU and off of a vent using IPV.
Intermittent High-Frequency Percussive Ventilation Therapy in 3 Patients with Severe COVID-19 Pneumonia. Look for this on our website.

Currently there are no peer reviewed papers from the U.S., but many facilities are reporting favorable results of using IPV therapy with these patients. Percussionaire has heard from facilities that say the use of IPV has helped to wean the flow and FiO₂ of patients on high flow nasal cannulas. Reports are coming in from Europe and Israel of facilities giving prolonged

IPV treatments of 1 – 2 hours duration directly to the endo tube of vented patients and patients on ECMO, with the resultant ability to wean these patients that were not weaning by traditional methods.

- How do I clean the VDR[®]4 ventilator or IPV therapy machine after use with a COVID-19 patient?

All disposable equipment should be removed and discarded per your hospital infection control policy. The devices should then be thoroughly wiped down with disinfecting wipes approved for use with COVID-19. Both VDR and IPV machines can also be safely left in the room if ultraviolet light is being used to disinfect the patient room but should still be wiped down with appropriate disinfecting wipes after the ultraviolet cleaning.

- What type of filter should I use for COVID-19 patients?

Any filter used should be a hydrophobic, HEPA class 13 filter. Filters of this type mean that they have a bacterial/viral filtration efficiency of 99.9999+% with trapping particles of 0.3 μ m. All particles bigger than 0.3 μ m are easy to trap. Because coronavirus species COVID-2019, MERS-CoV and SARS-CoV range in size from 0.06 to 0.2 μ m, many think that these filters are useless to protect against these viruses. But this is due to not understanding how HEPA filters and the rating works. Particles of 0.3 μ m are actually the hardest to trap and that is why HEPA filters are rated for that size. Particles smaller than 0.3 μ m are actually easier to trap. Particles smaller than 0.3 μ m are affected by Brownian movement and as a result do not travel in a straight line. They collide with other molecules and get trapped in the filter media.

Perry J.L., Agui J.H., Vijayakumar R. Submicron and Nanoparticulate Matter Removal by HEPA-Rated Media Filters and Packed Beds of Granular Materials. NASA/TM—2016–218224
<https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20170005166.pdf>

- Can I still give an IPV treatment to a COVID-19 patient on a ventilator?

Yes. Simply use the Percussionaire in-line valve and place the included blue cap on the expiratory port of the Phasitron[®]5.

- My hospital only uses volume control on their ventilators. I understand that I have to open the valve on the in-line adapter to allow excess flow to escape and reduce peak pressure on the ventilator. How can that be safe with an infectious patient?

Any flow that is allowed to escape from the valve is occurring on the inspiratory side of the ventilator circuit before it reaches the patient and also due to most ventilators utilizing a continuous bias flow, will not be containing any exhaled breath from the patient.

- I have been trained at my hospital to always have a cuff leak when using the VDR®4 ventilator. That raises concerns about aerosolized secretions being emitted into the room. How can that be safe?

A cuff leak is only needed if the patient has copious amounts of secretions to quickly help with removal of them or to allow more CO₂ to be removed in the event that control manipulations have not worked. There is no evidence to support the need for having a cuff leak all of the time and most facilities follow the above guidelines. If you do need to use a cuff leak for secretion removal the potential for aerosolization is no different than a non-intubated patient coughing.

Clinician feedback:

“We have had over 80 COVID-19 patients on VDR since March. Our successes have been interesting in that these patients have hypoxemia issues but our main reason for using the VDR has been to deal with high PCO₂s and respiratory acidosis while on conventional ventilation.”

**John Campbell, MA, MBA, RRT-NPS, RPFT, FACHE, Pulmonary Services Director
St. Dominic Hospital.**

“SBMC in NJ has been using the IPV and VDR with COVID19 patients since March.

- We now have a policy for early IPV intervention to prevent ICU admissions and while on CMV.
- We are now looking at early VDR (24-48hrs) in the ICU rather than rescue of failed CMV/INO/Proning”

**Bob Tero, RRT-NPS, CPFT
St. Barnabus Medical Center**

“There are currently 12 hospitals that are using the VDR-4 with COVID-19 patients in varying degrees. Legacy Emanuel uses the VDR primarily for all their COVID-19/ ECMO patients and patients with qualifying p/f ratios. The hospitals range from Legacy Hospital Systems in Portland to hospitals in Medford to Kaiser hospitals. An interesting side note is that Santa Clara Valley Medical Center has had

four dramatic rescues with continuous IPV in line also. Bakersfield has two hospitals that also use the VDR-4 for COVID-19 with some amazing rescues also.

On the Children's side, Valley Children's hospital has used the VDR four times on pediatric patients with good success. It is interesting, as pediatric COVID-19 intubated cases are just not as prevalent thankfully in most areas.

I think clinicians are more comfortable with active humidity with these patients this year and the use of filters for protection with these patients and therefore earlier consideration of the VDR.

I think it is not uncommon between this group of 12 hospitals for them to have 15 - 20 intubated VDR COVID-19 patients. I believe that this disease is still very difficult to treat, but the accelerated laminar flow the device produces and the increased alveolar surface area it can help to recover give patients one of their best chances for survival.”

Jeff Heltborg, RRT, Legacy Emanuel Hospital

Clinical Specialist

Pacific Biomedical