Safe use of Hamilton Medical ventilators on patients with highly infectious diseases

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This article gives you an overview of possible measures to ensure protection against internal contamination of the ventilators as well as the protection of patients and clinical staff.

We recommend implementing the following steps to avoid contamination:

- Follow the **instructions for use** of the ventilator and consider the **WHO guidelines**.[1,2]
- Use an **inspiratory bacterial and viral filter** to ensure non-contamination of the internal ventilator gas path.
- Protect the **expiratory valve** with a hydrophobic bacterial and viral filter.
- For **active humidification**, as with a HAMILTON-H900 humidifier, use a bacterial and viral filter on the inspiratory and expiratory port of the ventilator (hydrophobic version).
- For **passive humidification**, use a bacterial and viral HME/HMEF filter between the proximal flow sensor and the patient to protect the airway against contamination. Be aware of changes in anatomical dead space and airway resistance and exchange the filters regularly.
- Contamination of the **flow sensor tube connectors** is avoided due to permanent rinse flow through the flow sensor tubing towards the patient.
- The **Stand-by function** can be used prior to disconnecting the ventilator from the patient to avoid mucus dispersion from the circuit. This decision should be made by the responsible clinician based on the situation of the individual patient.
- Use **single-use consumables,** such as breathing circuits, flow sensors, airway adapters, expiratory valves, and filters, to minimize the risk of cross contamination when the ventilator is cleaned and set up for a new patient.
- Disinfect the outer surfaces of the ventilators during ventilation or after treatment of a patient with a registered hospital **disinfectant**. Consult the hygiene specialist in your facility regarding the appropriate disinfectant and follow the instructions for use of the manufacturer especially regarding contact time.
- For **suctioning,** use a closed inline suction system only.
- Reduce the need for **user interaction with the ventilator** by using Hamilton Medical's INTELLiVENT-ASV mode for intubated patients. INTELLiVENT-ASV continuously adapts the ventilation to the patient condition and requires fewer interactions by clinicians.[3,4]
- All turbine-driven Hamilton Medical ventilators (HAMILTON-C6/C3/C2/C1/T1/MR1) are equipped with high-grade **HEPA filters** to keep the interior airway free of contamination. There is no need to change the HEPA filters more frequently than indicated in your regular maintenance plan.

Make sure that **all clinical staff involved in the handling of the ventilator** are informed about the above-mentioned measures.

1 Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care. World Health Organization. https://apps.who.int/iris/bitstream/handle/10665/112656/9789241507134_eng.pdf?sequence=1&isAllowed=y
2 Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected Interim guidance https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-(ncov)-infection-is-suspected-20200125
3 Beijers AJR, Intensive Care Med. 2014 May;40(5):752-3.
4 Arnal, J.M.,Minerva Anestesiol, 2018. 84(1): p. 58-67.

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