Assessment of a Ventilator Circuit Adapter to be Used in Conjunction with the Respimat® Soft Mist Inhaler

Rationale

• With the introduction of the Respimat® Soft Mist Inhaler (SMI) there is a desire for an adapter to allow its use in ventilator circuits. An adapter (RespiConnect® Adapter) was assessed in terms of drug delivery and safety features.
• Patients on mechanical ventilation either involving prophylactic delivery of bronchodilators, or receiving such medication to treat a severe COPD exacerbation may need continuous therapy.

Methods

• Each adapter (n=10) was inserted in the inspiratory limb of a heated adult ventilator circuit
• A 7.0 mm Endotracheal Tube (ET) was attached to a filter and the distal side of the filter coupled to an adult test lung to simulate a patient
• A Servo ventilator (SV900C, Siemens, Sweden) delivered the required breathing pattern:
  • Tidal volume (Vt) = 600 mL
  • 10 breaths/minute
  • Inspiratory/expiratory (I/E) ratio = 1:3
  • 5 cm H2O Positive End Expiratory Pressure (PEEP)

Results

• During the experiment the circuit did not lose pressure and no alarms were triggered, indicating that the self-sealing valve was effective.
• Mean values of 30.3% and 29.4% LC were determined for SAL and IPR respectively.

Conclusions

• It is known that not having a good consistent seal can jeopardize the safety of the patient through circuit leakages and a consistent seal is also needed in order to achieve adequate drug delivery to the patient.
• The presence of a self-sealing valve and safety cap for the RespiConnect® Adapter should ensure ventilator circuit integrity and therefore also help protect the safety of the patient.
• Approximately 30% LC of both drug components in the SMI was delivered to the distal end of ET tube via the adapter.
• This study provides clinicians assurance regarding circuit integrity and likely drug delivery performance when using the RespiConnect® Adapter.

Study Purpose

• The RespiConnect® Adapter was designed for safety and mechanical performance.
• The self-sealing mechanical valve maintains the integrity of the ventilator circuit at all times; a redundant cap is incorporated for extra safety.
• This study assessed mechanical performance through its ability to retain circuit integrity as well as aerosol drug delivery in a ventilator.