Staff awareness of the error of using both a heated humidifier and a heat and moisture exchanger in the same ventilation circuit

Vikesh Patel, Catherine Peutherer (University of Cambridge)
Emily Hodges, Maryanne Mariyaselvam, Peter Young (Queen Elizabeth Hospital, Kings Lynn)
Introduction

- Mechanical ventilation bypasses normal upper respiratory tract physiology

- Needs high flow rates

- Increased mucosal viscosity, impaired mucociliary action, sputum retention

- Ultimately ventilator associated pneumonia and airway occlusion
Artificial Humidification

- Active - Heated Humidifiers (HH’s)
- Passive - Heat and Moisture exchangers (HME’s)
- Similar efficacy (Kelly et al., 2014),
- Both widely used (Doyle et al., 2015)
  - Postal study
Dangers of dual use

- Doyle et al. (2015) bench study
  - Decreased tidal volume
  - Critical airway occlusion

- Serious incident on our ICU

- Mechanism?
  - Condensation on HME membrane
  - Resistance to airflow – *airway occlusion*
  - Ventilator associated pneumonia
Our study

- **Aim**

  “To assess whether experienced ICU staff notice the dual use of both a HH and a HME in a simulated ventilation circuit and correct the error”

- **Methods**
  - Simulation study
  - 20 staff to assess circuit – any changes?
  - Other clinical tasks
Methods

Active Heated Humidifier

Passive Heat and Moisture Exchanger
Results

- 25% noticed error and removed HME

- 15% indicated to the HME in the circuit
  - Did not recognise this as a safety issue
  - Did not wish to remove HME when asked if they would remove it

- One participant removed HME to inspect its patency, then placed it back into the circuit
Conclusions

- Currently poor knowledge retention
- Potentially fatal error
- MHRA NHS patient safety alert, Dec 2015
- Our policy
References


Questions?