



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

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# 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

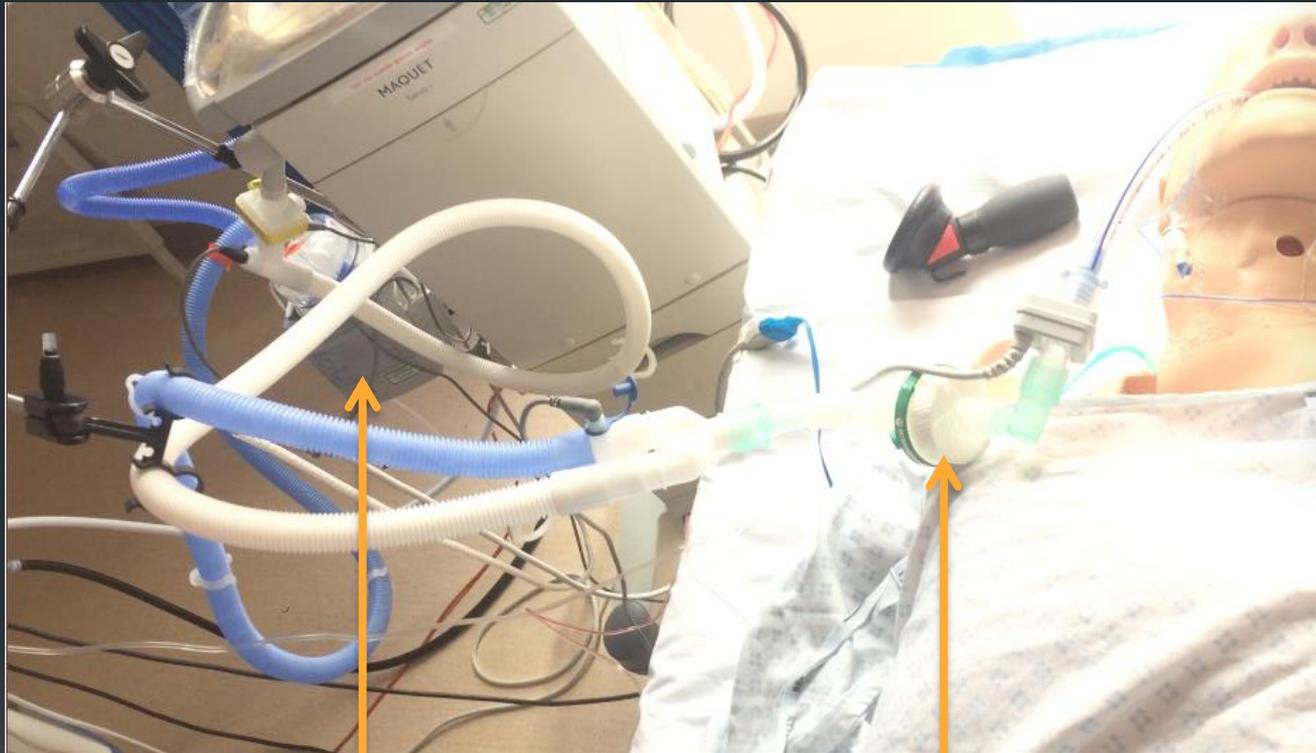
- Aim

*“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

- 1) Kelly M., Gillies D., Todd DA. and Lockwood C. (2010). Heated Humidification versus Heat and Moisture Exchangers for ventilated adults and children. *Cochrane Database of Systematic Reviews*, Apr 14(4), Art. No.: CD004711
- 2) Doyle, A., Mariyaselvam, M., Wijewardena, G., English, N., Gent, E., Young, P. (2015). The simultaneous use of a heat and moisture exchanger and a heated humidifier causes critical airway occlusion in less than 24 hours. *Journal of Critical Care*, Volume 30(4), p. 863

Questions?

