

HUMIDIFIED AND HEATED GAS FOR PRETERM INFANTS AT BIRTH

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INTRODUCTION

The use of humidified and heated gas during respiratory support is standard care for infants. Heat and humidity are required to prevent hypothermia, inspissation of airway secretions, necrosis of airway mucosa and nosocomial infections. The physical characteristics of preterm infants and their large skin-air temperature gradient make them at risk for a high evaporative heat loss after delivery. The consequent hypothermia has been associated with increased mortality and morbidity.

1. AIM

- To provide heated humidified gases at birth for preterm infants <32 weeks

2. PATIENT

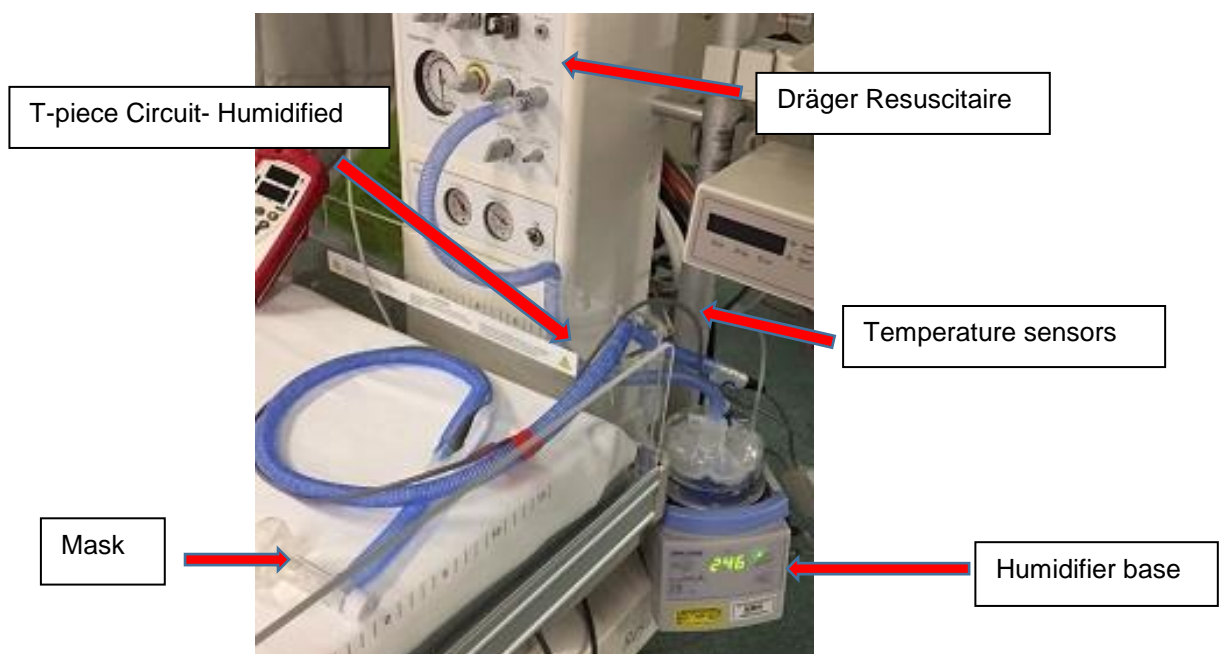
- Neonates

3. STAFF

- Medical and nursing staff

4. EQUIPMENT

- Infant T-piece resuscitator (Dräger Resuscitaire bed)
- MR850 Heated Humidifier
- T-piece Circuit- Humidified (900RD110 [Fisher and Paykel Healthcare])
- Water for irrigation 1L.



ROYAL HOSPITAL FOR WOMEN

LOCAL OPERATING PROCEDURES

NEONATAL SERVICES DIVISIONApproved by
Neonatal Services Division Quality Committee

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- Turn on the radiant heater.
- Connect the power cord of the humidifier base to the wall power outlet and switch it on.
- Connect the humidification chamber to the water for irrigation bag.
- Set the gas flow at 8 L/min.
- Connect the humidified T-Piece Neopuff circuit to humidifier chamber.
- Place infant <30 weeks GA in sterile plastic bag under the radiant warmer - Do not dry these infants.
- Perform resuscitation.
- Disconnect humidifier base from power outlet prior transfer to NCC.
- Once the infant is in the NICU, transfer to the standard humidified respiratory support as per NCC protocol.

6. DOCUMENTATION

- Progress notes

7. EDUCATIONAL NOTES

- The use of cold un-humidified gas at the time of birth and during transport increases the incidence of hypothermia on admission. Infants born at or less than 32 weeks who received respiratory support with cold air had a mean rectal temperature on admission of 35.9°C. Infants who received heated humidified gas had a rectal admission temperature of 36.4°C (*Te Pass et al 2010*).
- *Tarnow-Mordi et al* showed that mechanically ventilated preterm infants experienced more air leaks and more severe chronic lung disease when <36.6 C° inspired gas was given. The use of dry air leads to impaired surfactant activity (*Shelly MP et al, 1988*).
- Cold and dry air dehydrates the mucus, which slows the transport rate and cilia beat frequency, which lead to inspissations, inflammation, and sloughing of the airway mucosa. The water loss by evaporation may induce bronchial smooth muscle contraction leading to bronchoconstriction. (*Schulze A et al, 2002*)
- In a multicentre trial (*Meyer MP et al, 2015*) compared the effects of heated humidified gases (HHG) versus cold, dry gas as initial respiratory support from delivery until arrival at the neonatal unit. It was observed that HHG not only led to an increase in normothermia (69% vs 55%) on admission but it was also more effective in reducing severe hypothermia than cold, dry gas (2% vs 12%).

8. RISK RATING

- Medium

9. REFERENCES

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- Shelly MP, Lloyd GM, Park GR. A review of the mechanisms and methods of humidification of inspired gases. *Intensive Care Med*. 1988;14(1):1–9.
- Meyer MP, Hou D, Ishrar NN, Dito I, TE Pas AB. Initial respiratory support with cold, dry gas versus heated humidified gas and admission temperature of preterm infants. *The Journal of Pediatrics* 2015; 166(2): 240-250.

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