

TRANSCUTANEOUS CO₂ AND O₂

(Adapted with permission, Guy's and St Thomas' NHS Trust nursing guideline)

INTRODUCTION

- In neonates requiring assisted ventilation, it is essential to monitor arterial partial pressure of oxygen (PaO₂) and carbon dioxide (PaCO₂) to ensure ventilation adequate
- Transcutaneous monitoring allows constant measurement (TcCO₂ and TcO₂)
- Use this guideline to set up and safely use transcutaneous monitoring equipment

Clinical indications

- Monitoring adequacy of arterial oxygenation and/or ventilation
- Nursing critically ill or unstable baby

Advantages

- Reduction in number of blood gas measurements
- Immediate recognition of need for ventilation adjustment

Potential problems

- Tissue injury (e.g. erythema, blisters, burns, and skin tears) as a result of failure to change site frequently enough (2–3 hrly) according to local protocol
- Inadequate measurement resulting from incorrect set-up

EQUIPMENT

- Transducer: insert at end position of rack for easy accessibility
- Membranes
- Electrolyte solution
- Adhesive fixation rings
- Recalibration machine

Probe placement and application of fixation rings

- Preferred sites:
 - if baby nursed prone: the back
 - if baby nursed supine: the chest
- Avoid bony surfaces: use soft tissues (e.g. abdomen, buttock, thigh) and avoid placing over liver as this can prevent accurate clinical assessment of liver size
- Ensure chosen site is clean and dry
- Peel adhesive protection layer off ring
- Place ring on chosen site pressing gently on centre of ring before running finger around outside. Ensure effective seal as this will affect accuracy of measurement
- Place three drops of contact fluid in centre of ring
- Remove transducer from module into ring and turn one-quarter clockwise to secure

CARE AND MONITORING

Temperature setting

- Keep transducer setting at 44°C for all babies. There is good correlation of TcO₂ with heat settings of 44°C but lower settings will result with under-reading of TcO₂ and difference is larger with increasing TcO₂

Alarm settings

- Limits may vary for treatment of PPHN
- TcO₂ upper 10.0 lower 5.5

- TcCO₂ upper 7.0 lower 5.0

Blood gas sampling

- Take blood gas 20 min after commencing transcutaneous monitoring to allow comparison between monitoring values and arterial partial pressures of O₂ and CO₂ levels, as discrepancy can occur
- If transcutaneous monitoring values change suddenly, check contact is in place, before making ventilator changes. If any doubt about accuracy of values, check blood gas before making ventilator changes

Changing measurement site

- Babies <29 weeks: change 2-hrly
- Babies ≥29 weeks: 3-hrly
- Unscrew transducer before removing fixation rings
- Remove fixation rings when repositioning baby from supine to prone and vice versa to avoid pressure-sore from lying on rings
- Remove rings 12-hrly on babies <29 weeks and 24-hrly on babies >29 weeks

Calibration of membrane

See Figure 1-5

Indications

- Transducer membrane has been replaced
- Monitor displays 'calibration required'
- Measurement values in doubt
- Applying to a new baby
- Changing measurement site

***Ensure calibrator is turned off after use. Do not dispose of connecting tube.
Contact technicians when calibrating gas empty***

Changing transducer membranes (see Figure 6-10)

- All staff responsible for ventilated babies can change transducer membranes

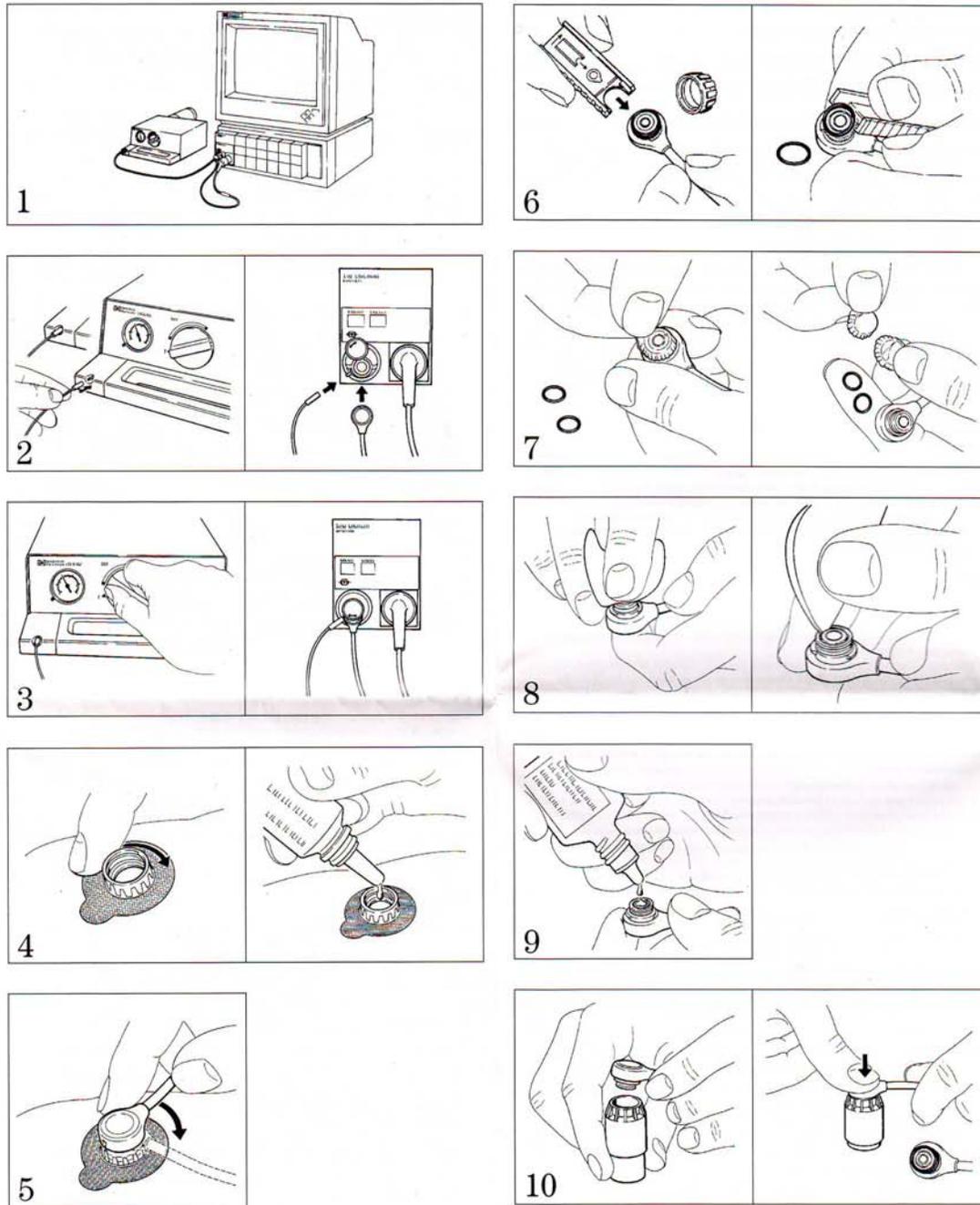
Indications

- When using a new transducer or if transducer has dried out
- For each new baby
- When membrane crinkled, scratched or damaged
- After 5 days continuous use

Procedure

- Wash and dry hands
- To remove O-rings, unscrew protective cap from transducer and hook O-ring remover under them
- Remove both clear plastic membranes with your fingers
- To ensure correct values, clean transducer head, including groove and rim, with absorbent paper to remove all old electrolyte solution
- Apply approximately two drops of electrolyte solution to transducer head
- Press transducer head downward into an unused membrane replacer until replacer reacts as far as it can and a click is heard

Figure: 1-5 Calibration of membrane; 6-10 Changing transducer membranes



CE This product complies with the requirements of the Council Directive 93/42/EEC June 1993 (Medical Device Directive).

For USA
United States law restricts this device to sale by or on the order of a physician.