

Incubator Humidity for Premature Neonates

Introduction

Neonates below 30 weeks gestation have an underdeveloped epidermis and stratum corneum (which controls evaporative heat loss and transepidermal water loss (TEWL)). They are at increased risk of high water loss through the skin, leading to temperature instability, dehydration and electrolyte imbalance, as well as heat and calorie loss. Increasing humidity to the surrounding environment can significantly reduce these from occurring.

After birth the skin of preterm babies is exposed to a gaseous environment and matures rapidly, both in its epidermal structure and its barrier function (Agren et al, 2006). By about 2 weeks after birth (regardless of gestation) the neonate's skin functions like that of a term baby (RPAH, 2001)

Environmental humidification (EH) is able to reduce TEWL and assist with temperature regulation. However, nursing babies in EH has also been shown to slow the natural process of epidermal barrier formation or 'skin adaptation' to the external environment. We need to balance the infants' need for heat and humidity with the adaptive benefits of a drier environment for stimulating epidermal DNA synthesis.

Many different guidelines exist, this guideline is based on the common threads of those listed in the references. The reasons for the variation in guidelines is not clear but is likely to reflect personal practices rather than strict evidence.

Assessment

All infants below 30 weeks gestation admitted to NICU, and below 2 weeks of age, should be commenced in humidity as soon as possible. Clothing or woollen blankets are not needed.

Management

Babies less than 28 weeks gestation

Commence 80% incubator humidity
Continue for 7 days
After 7 days, wean by 5% each day
Cease incubator humidity when 40% is reached

Babies 28 – 29+6 weeks gestation

Commence 80% incubator humidity.
After 1 day wean humidity by 5% each day.
Cease incubator humidity when 40% is reached

Commence humidity as soon after admission as possible. Do not delay unless absolutely necessary (e.g. an urgent procedure). Extremely preterm babies (<25 weeks) may require humidification for longer if there are problems with dehydration / hypernatraemia, but most will not. Incubator temperature may need to be increased when the humidity is decreased to ensure thermal stability for the baby.

There are concerns that prolonged humidification may increase the risks of sepsis, so prolonged humidification should not be routine and should be reviewed regularly.

Use sterile water only, to prevent colonisation by bacteria, check regularly especially on high humidity (incubator will alarm if water levels low). It is not necessary to keep the humidity on in the Drager incubators. Empty the water tank when the humidity is turned off. Change incubators weekly.

References / Reading

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