Equipment needs for premature babies in special care or intensive care

ABSTRACT

Neonates who require additional care, be it in a special care baby unit, neonatal intensive care unit or just on the labour ward, may need specific equipment to allow the team to care for them accurately and safely. This article outlines some of the specific types of equipment which may be needed.

Keywords: premature babies; special care unit; neonatal intensive care unit; incubators; nutrition; jaundice.

Consultants, nurses and midwives caring for premature and unwell babies know that their role can be one of the most rewarding and challenging jobs. In addition to ensuring these tiny patients are in the optimal environmental conditions, and looking after their nutritional and medical needs, there is also a need to provide support to their parents who may be going through one of the most frightening and overwhelming times of their lives.

On the neonatal intensive care unit, high-dependency care or special care baby unit, having the right equipment is paramount. One reason for this is so that more time can be spent caring for babies and their families, rather than wasting time trying to use unsuitable products and technologies. Another reason is to provide babies with the most comfortable experience, and to facilitate the involvement of parents in the care of their baby.

The equipment needed to care for babies who are premature, or who require special care, is varied and the list can be long. However, this article provides a rundown of some of the essentials that can make the life of a doctor, nurse or midwife tasked with this job easier, and facilitate compassionate and individualised care for the babies they are looking after.

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Staying warm

Neonates must be cared for in a neutral thermal environment: this is 'the environmental air temperature at which an infant with a normal body temperature has a minimal metabolic rate and therefore a minimal oxygen consumption' (Parsons, 2017). Maintaining a neutral thermal environment, according to Great Ormond Street Hospital, is the ultimate aim of temperature control and management for the neonate (Parsons, 2017), as the preterm neonate is extremely susceptible to heat loss (Peiris and Fell, 2009).

Incubators provide the right environmental conditions for a baby who does not have the benefit of remaining in the mother's womb until the due date. An incubator may include several different components. For example, it may have an AC-powered heater, a fan to circulate the warmed air, a water container for the addition of humidity, a control valve for the option to add oxygen, access ports for nursing care, and possibly a servocontrol with a temperature-sending thermometer taped to the baby's abdomen to help regulate the temperature within the incubator (Sandham, 2016).

Some examples of incubators can be obtained from Central Medical Supplies Ltd, and Draeger Medical UK Ltd. There are also several types of transportable incubators and ambulance restraints available from companies such as ParAid Medical and Draeger Medical UK Ltd should a mobile intensive care unit be required during patient transfer.

If only warming is needed, other types of thermoregulation are available in the form of warming systems, as an alternative to an incubator. For example, the KanMed Baby Warmer from Central Medical Supplies Ltd is advertised to emulate skin-to-skin comfort with its warm water 37-degree mattress. The Unique cerebral function monitor, which is one option among several offered by Inspiration Healthcare, uses Bluetooth technology to wirelessly connect to any PC in the clinical area. Solus Medical Ltd also offers a blood and fluid warmer, as well as a warming mattress.

The Neo-Restraint, designed and manufactured by Paraid, is a fully adjustable close proximity harnessing system to reduce the harmful effects of excessive movement during neonatal transfer.

Breathing easier

One reason a premature baby may not use an incubator is if he/she is in danger of going into respiratory arrest; in this case, a baby may be placed in an overhead radiant cradle so that he/she is accessible to the doctors, nurses and midwives who are providing the care (Sandham, 2016).

Options for respiratory support may range from cardiorespiratory monitors, extra oxygen through a ventilator mask or prongs, continuous positive airway pressure used with a mask or nasal cannula, to mechanical ventilation. These are available from Draeger Medical UK Ltd, Solus Medical Ltd, Central Medical Supplies Ltd and Inspiration Healthcare, among others. Solus Medical Ltd has a high-flow nasal cannula designed to heat and humidify inhaled gas and deliver oxygen therapy.

Nutrition needs

One thing that premature and ill babies have in common with all newborn babies is that their schedules are dominated by their feed times and nappy changes. A baby who is too small or too ill will need extra help to meet their nutritional and hydration needs.

For babies not receiving expressed breast milk, formula specifically designed for the preterm neonate is available from companies such as Nutricia, SMA Nutrition and Fresenius Kabi. Biofloratech Ltd offers probiotic drops for babies which are approved for use in the NHS. There are also enteral and parenteral feeding systems. Enteral feeding is a way of artificially providing infants with nutrition via a nasogastric tube, which passes through the nose and oesophagus into the stomach. The Nutrisafe 2 enteral feeding range from Vygon is designed to follow National Patient Safety Agency guidelines on safe and secure enteral feeding.

However, in very low birthweight infants (<1500 g), there are often complications which will lead to a delay of full enteral feeds, requiring parenteral nutrition to meet the preterm infant's needs. Examples of such complications may include immature lung function (which may require endotracheal intubation and mechanical ventilation), hypothermia, infections and hypotension (Schanler, 2017). Parenteral feeding systems for neonates are available from Vygon and Fresenius Kabi.

As preterm neonates are susceptible to heat loss, they are also susceptible to evaporative loss and usually have increased fluid requirements. Paediatrics.co.uk offers a fluid prescribing page that will identify a neonate's fluid prescription when you enter details of the gestation at birth, the weight, and the fluid/electrolyte requirements (http://paediatrics.co.uk/nicu/fluid-prescribing). Nova Biomedical UK also offers electrolyte analysers, and glucose and ketone monitoring systems (StatStrip GLU/KET). StatStrip Glucose from Nova Biomedical UK provides improved accuracy for use in neonates. StatStrip Glucose has been designed specifically to measure and correct for clinical interferences, such as galactose and maltose. As

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babies who are preterm (born before 37 weeks) have lower glycogen stores than term babies, and their gluconeogenesis pathways are underdeveloped, routine glucose monitoring is essential (Peiris and Fell, 2009).

Getting a line

A venous cannula may be needed to deliver medicines to a baby who is ill. This may then be attached to an infusion pump to ensure the drugs are being administered in the right dose and at the right rate.

Cannulae and intravenous catheters for neonates are available from companies such as Vygon and Solus Medical Ltd; while other types of infusion and intravenous equipment are available from Fresenius Kabi, among others. A cannula may also be used to test a baby's blood pressure, oxygen and carbon dioxide levels. However, blood pressure monitors and cuffs, blood gas analysis and haemoglobin monitoring machines may also be needed when carrying out these types of tests and monitoring the health of a premature or unwell neonate.

A range of blood sampling and blood pressure equipment is offered by Solus Medical Ltd and Inspiration Healthcare. For example, Inspiration Healthcare offers a 'vein-viewer'

(Christie Medical VeinViewer) to help make the process of seeing a neonate's tiny vasculature easier, as well as sucrose vials to calm and comfort a baby during a painful procedure. Blood gas analysers and monitors, as well as blood pressure and haemoglobin testing and monitoring equipment, is also available from Masimo UK Ltd.

In living colour

Jaundice is common among newborn babies in general, caused by the build-up of bilirubin in the blood (see p. 699). Among premature or ill babies, the National Institute for Health and Care Excellence (2010) recommends fibreoptic phototherapy or conventional 'blue light' phototherapy as a treatment except under certain circumstances, such as when the serum bilirubin level is rising more than 8.5 mmol/litre/hour. Phototherapy equipment as well as a non-invasive jaundice meter for consistent screening is available from Draeger Medical UK Ltd.

Babies being treated for jaundice must also have their temperature monitored, be kept in a thermoneutral environment (that will minimize the baby's energy's expenditure), have their hydration monitored through daily weighing and assessment of wet nappies, use eye protection and have routine eye care (National Institute for Health and Care Excellence, 2010).

Making connections

One of the most important aspects of care delivered in a neonatal intensive care unit, or other high-dependency or special care unit, is the support offered to parents and other family of the baby. In fact, some companies offer developmental care products which focus specifically on supporting the family. Inspiration Healthcare has a sibling support package called the 'Getting to know your baby pack' with crayons, colouring sheets and a keepsake box for children with siblings in the intensive care unit. vCreate TV offers secure video messaging to connect parents with their babies in NHS neonatal units.

Conclusions

The equipment needed to care for a preterm or ill neonate is of course not limited to that covered in this article, and all of this equipment is important. Beyond using it to nurse a baby back to health so that he/she can return home, this equipment can be used to facilitate connections. Through what can be a very difficult time, families may be comforted by becoming involved with many aspects of their baby's care – and user-friendly equipment is central to this goal. **BJHM**

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