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Clinical paper

Marked variation in delivery room management in very preterm infants

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ABSTRACT

Background: The International Liaison Committee on Resuscitation (ILCOR) and UK Resuscitation Council (UKRC) updated guidance on newborn resuscitation in late 2010.
Objectives: To describe delivery room (DR) practice in stabilisation following very preterm birth (<32 weeks gestation) in the UK.
Methods: We emailed a national survey of current DR stabilisation practice of very preterm infants to all UK delivery units and conducted telephone follow-up calls.
Results: We obtained 197 responses from 199 units (99%) and complete data from 186 units. Tertiary units administered surfactant in the DR (93% vs. 78%, $P = 0.01$), instituted DR CPAP (77% vs. 50%, $P = 0.0007$), provided PEEP in the delivery room (91% vs. 69%, $P = 0.0008$), and started resuscitation in air or blended oxygen (91% vs. 78%, $P = 0.04$) more often than non-tertiary units. Routine out of hours consultant attendance at very preterm birth was more common in tertiary units (82% vs. 55%, $P = 0.0005$).
Conclusions: Marked variation in DR stabilisation practice of very preterm infants persisted one year after the publication of revised UKRC guidance. Delivery room care provided in non-tertiary units was less consistent with current international guidance.

1. Introduction

Approaches to delivery room (DR) stabilisation of preterm infants should reflect International Consensus on Cardiopulmonary Resuscitation (ILCOR) and UK Resuscitation Council (UKRC) guidelines. These were recently updated.[1,2]

While only around 10% of term infants need additional support in perinatal transition[2] many very preterm infants benefit from assisted stabilisation in the delivery room. Only a few studies have examined the consistency in clinical practice in DR resuscitation and data from other developed countries on standard clinical practices in DR resuscitation showed inconsistency and discordance from current clinical evidence.[3–8] A recent study by Mann et al. showed marked variations in resuscitation practices of term infants among UK neonatal units.[3]

Few data describe current clinical practices in delivery room stabilisation of preterm infants although clinical opinion suggests effective stabilisation is important for good outcome.[6,7]

The aims of our study were:

1. To describe current DR stabilisation practices for very preterm infants (<32 weeks) of gestation at UK neonatal units.
2. To identify differences in clinical practice by unit level.

2. Methods

We sent a structured questionnaire about usual DR management after very preterm birth in the UK.

In September 2011, we sent a previously piloted structured web based questionnaire to neonatal contacts on the central database of British Association of Perinatal Medicine (BAPM) and National Perinatal Epidemiology Unit (NPEU) asking about usual delivery room management following very preterm birth at the 199 delivery centres. Between October and November 2011 we resent the questionnaire. Finally, we contacted non responding units by telephone between December 2011 and January 2012, accepting a response from a consultant, senior trainee or senior nursing sister.

Abbreviations: NICU, neonatal intensive care unit; DR, delivery room; CPAP, continuous positive airway pressure; PEEP, positive end expiratory pressure; NDAU, neonatal data analysis unit; NPEU, national perinatal epidemiology unit.

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The data were analysed using Fisher's exact test for categorical variables and Mann–Whitney *U* test for non-parametric numerical variables. In all the domains a $P < 0.05$ was considered statistically significant. In analysing data NICUs were considered as "tertiary units" while local neonatal units (LNUs) and special care units (SCUs) were classified as "non-tertiary" units.

Our study was approved by local research and development (R&D) department at Bradford Teaching Hospitals NHS Foundation Trust but did not require ethics advisory committee approval.

3. Results

We obtained 197 responses from 199 hospitals (99%), with 186/197 (94%) questionnaires fully completed. Completion rates were similar between tertiary ($n = 55$, 92%) and non-tertiary (131, 95%) units. Of the total 197 responses, 39% ($n = 78$) responders were consultants, 14% ($n = 28$) senior trainees, and 46% ($n = 91$) senior neonatal sisters.

3.1. CPAP provision

Overall 60% units (112 of 186 units) provide CPAP routinely during stabilisation following very preterm birth. Tertiary neonatal units provided CPAP following very preterm birth as part of the stabilisation process in DR more frequently than non-tertiary neonatal units (77% vs. 50%, $P = 0.0007$) (Fig. 1).

Out of those centres routinely giving CPAP, 11/44 (25%) tertiary units only do this routinely for babies with gestation <28 weeks compared to 4/68 (6%) of non-tertiary units ($P = 0.008$).

There was marked variation among both tertiary and non-tertiary neonatal units in clinical practice under what gestation they provide CPAP to non-ventilated infants routinely (range under 26–32 weeks of gestation).

For ventilated infants, 76% units (142 units) provide positive end expiratory pressure (PEEP). There was a significant difference between tertiary and non-tertiary centres (tertiary 91%, non-tertiary 69%, $P = 0.0008$).

3.2. Surfactant administration

Administration of surfactant in DR, regardless of infant condition, was reportedly part of their standard resuscitation practice in 157 units (82%) while in 34 units (18%) this surfactant administration in DR was not a routine practice. Tertiary units were more likely to do so (93% vs. 78%, $P = 0.01$).

Out of those centres routinely giving surfactants, 41/52 (79%) tertiary units only do this routinely for babies with gestation <28 weeks compared to 54/105 (51%) of non-tertiary units ($P = 0.001$).

There was wide variation in gestational age (range under 27–32 weeks; median for tertiary units <28 weeks while for non-tertiary units was <29 weeks) under which different neonatal units routinely administered surfactant in DR as part of standard resuscitation practice.

3.3. Oxygen therapy

Of the 186 units providing data, 69 units (37%) commence stabilisation in air, 83 units (45%) in blended oxygen and 34 units (18%) in 100% oxygen. Tertiary units started stabilisation in air or blended gas more frequently than non-tertiary units (91% vs. 78%, $P = 0.04$) (Fig. 2).

3.4. Use of pulse oximeter

Pulse oximetry to monitor heart rate or titrate oxygen delivery was used routinely in 30% units ($n = 56$). For 10 units (5%) this data was not provided. There was insufficient evidence of a difference in pulse oximetry between tertiary and non-tertiary units (79% vs. 66%, $P = 0.12$).

3.5. Thermoregulation

Almost all neonatal units (190 of 192; 99%) use plastic wrapping to enhance thermoregulation in the DR and there was no statistical difference between use of plastic bag in tertiary and non-tertiary units ($P = 0.477$). Median gestation under what both tertiary

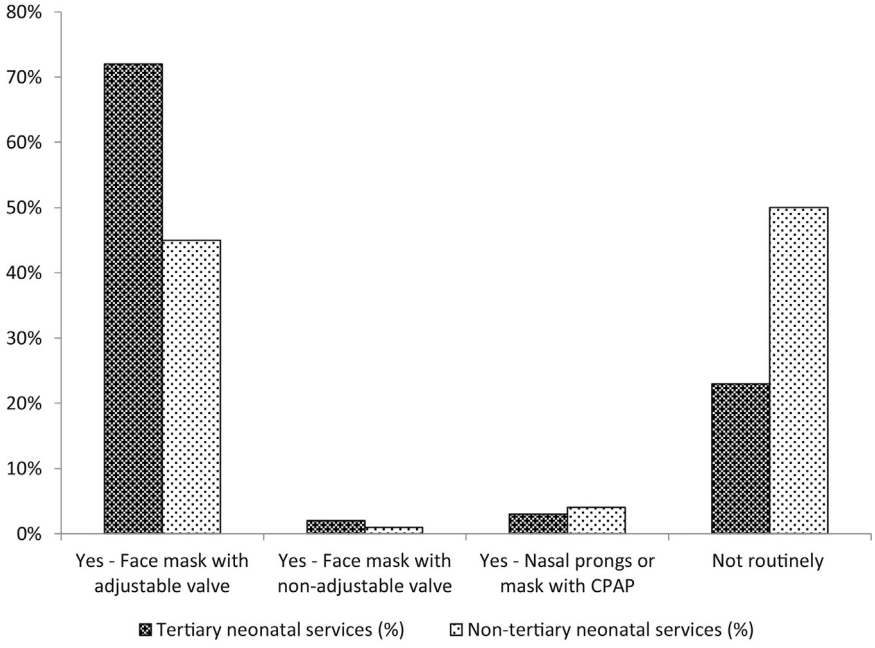

Fig. 1. Mode of CPAP or PEEP provision during DR stabilisation among tertiary and nontertiary neonatal services UK 2011–2012.