Hospital admissions for bronchiolitis in preterm infants in the absence of respiratory syncytial virus prophylaxis

Respiratory syncytial virus (RSV) is the causative agent in more than 50% of cases of bronchiolitis, with mycoplasma pneumonia, Para influenza 3, adenovirus, and some other viruses accounting for most of the remaining cases. Mortality from bronchiolitis rangoes from 1% to 3%. Although as yet there is no safe and effective vaccine, passive immunity with Palivizumab has been shown to reduce hospital admissions of preterm babies, but no reduction in mortality, intensive care admissions, or ventilation days was observed. Critical appraisal of this study reveals that the number of infants to be treated to prevent one hospital admission is between 17 and 22.

The objectives of our study were to document local admission rates of premature infants from clinical bronchiolitis, assess local mortality and morbidity secondary to bronchiolitis, and examine seasonal and annual variation of bronchiolitis admissions. By examining hospital admission databases in Cork University Hospital, all admissions between 1997 and 2001 for clinical bronchiolitis, including intensive care admissions, were identified. Parents of premature infants (32 weeks) born in the Maternity Services in Cork in 1997–2001 were contacted by telephone and postal questionnaire, with a response rate 82%.

Thirty-five of 174 babies (20%) were admitted for bronchiolitis over this five year period. Total hospital inpatient stay was 175 days. Average length of stay was five days per infant. Peak incidence of bronchiolitis in preterm infants was in March. Whereas the number of preterm admissions increased over the years, the percentage admitted with bronchiolitis decreased (fig 1). None of the preterm infants admitted with bronchiolitis required admission to the intensive care unit. Indeed only five infants, all born at term gestation without underlying conditions, required intensive care admission and ventilation for clinical bronchiolitis during this time. There were no deaths from bronchiolitis in either premature or term infants.

Palivizumab cost €940 and €564 per 100 and 50 mg vial respectively. At a dose of 15 mg per kg, with five doses per season (as recommended by the American Academy of Pediatrics), provision of prophylaxis to all our premature babies (32 weeks) would cost >€400 000 compared with inpatient hospital cost for premature infants with bronchiolitis approximating <€50 000.

Bronchiolitis due to RSV and other viruses is still a major problem in preterm infants. The role of parental education (RSV: Reduce exposure, no Smoking, Very good hand washing) has not been evaluated. We believe that, given the absence of a reduction in mortality and significant morbidity (ventilation, admissions to intensive care), the role of Palivizumab for RSV prophylaxis for premature infants remains questionable, with the potential long term benefit of RSV prophylaxis as yet undetermined.

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Reference


Current use of nasal continuous positive airways pressure in neonates

Neonatal applications of nasal continuous positive airways pressure (NCPAP) include prevention of extubation failure, apnoea of prematurity, and as an alternative to intubation and ventilation in respiratory distress syndrome, in very preterm infants, and in exacerbations of chronic lung disease. On our neonatal unit we deliver all CPAP using the Infant Flow Driver (IFD) (EME Ltd, Brighton, UK). We were interested in how other units currently use the IFD and wean infants from NCPAP.

Between December 2003 and April 2004 we surveyed all 38 neonatal units with intensive care cots in the Northern Region of England. We posted a questionnaire and stamped addressed envelope to the unit nurse manager. We made a follow up telephone call to all units that did not respond and for incomplete or ambiguous replies. We obtained a 100% response rate. Table 1 summarises the main indications for NCPAP and weaning practices in 34 units that used the IFD.

We found that briefly intubating, giving surfactant, then starting NCPAP is common in infants with severe respiratory distress syndrome and in very preterm infants. This is despite scant evidence to date that the practice decreases chronic lung disease or need for mechanical ventilation.

The optimal method of weaning infants from NCPAP remains unanswered. We found that although some units try abrupt discontinuation of NCPAP, most wean on an ad hoc basis by gradually decreasing either time spent on the IFD or the CPAP pressure. Only three units (6%) had a weaning protocol, although most respondents (85%) would welcome formal weaning guidelines.

Table 1 Use of Infant Flow Driver nasal continuous positive airways pressure (NCPAP) in the Northern Region of England

<table>
<thead>
<tr>
<th>Indications</th>
<th>Routinely</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial management of RDS</td>
<td>41 (76)</td>
<td>13 (24)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Severe RDS/very preterm in conjunction with surfactant</td>
<td>25 (46)</td>
<td>21 (39)</td>
<td>8 (15)</td>
</tr>
<tr>
<td>Apnoeas</td>
<td>24 (45)</td>
<td>25 (46)</td>
<td>5 (9)</td>
</tr>
<tr>
<td>After extubation</td>
<td>50 (93)</td>
<td>3 (5)</td>
<td>1 (2)</td>
</tr>
</tbody>
</table>

NCPAP weaning

<table>
<thead>
<tr>
<th>Method</th>
<th>Who decides when to wean?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time off</td>
<td>36 (66)</td>
</tr>
<tr>
<td>Pressure</td>
<td>2 (4)</td>
</tr>
<tr>
<td>No set method</td>
<td>16 (30)</td>
</tr>
</tbody>
</table>

Values are number (%) of units.

RDS, Respiratory distress syndrome.
The wide variation in local practice undoubtedly reflects the lack of published trials. Formal comparisons of weaning regimens are necessary to minimise morbidity resulting from undertreatment and overtreatment with NCPCP.

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References


Consensus on neonatal infusion pumps and pressure monitoring

Wilkins and Emmerson highlighted the lack of consensus on the management of extravasation injuries in neonates. Modern neonatal infusion pumps can measure intravenous pressure and could theoretically detect early infiltration and subsequent extravasation injuries. However, in clinical practice, extravasation injuries appear to occur even when inline pressures are monitored and cannulae sites are inspected hourly. However, it is a common misconception that occlusion alarms on infusion pumps will signal infiltration. In fact, pumps will alarm only when downstream pressure reaches a specified value, and elevated pressures resulting from infiltration are typically far lower than occlusion-triggering levels.

When infants, monitoring of inline intravenous pressure is not useful for detecting or infusing of peripheral catheter sites. Resistance measurements may be useful in detecting infiltration injuries, but are not widely available and at present there are no commercially available infusion pumps that can reliably detect infiltration. We undertook a telephone survey of 14 tertiary neonatal centres to determine whether there was consensus on monitoring infusion pumps and pressures, cannulae sites, and the management of any resulting tissue injury. Sufficient units had their own written guidelines on the monitoring of infusion pumps and pressures, cannulae sites, and

the management of any resulting tissue burns. A variety of volumetric (43% Ivac) and syringe (30% Alaris) pumps were used. Monitoring of infusion pressures were by either actual inline pressure readings or a standardised “bar” system depicting pressure readings, or by both methods. Pressure alarms were calibrated for individual babies, set to 10 to 150 “units” above the baseline reading, or preset by the manufacturer to arbitrary settings. Pressure readings were recorded hourly on either the fluid or inline care charts (78%), and the remain-
der only observed the pressure readings. Some units used cannulae for total parenteral nutrition (four), 15% dextrose or inline pressure monitoring to predict or detect extravasation injuries. The most common pump used in this survey was the Alaris. Standardised “bar” system depicting pressure readings were calibrated for individual babies, and inline pressure readings were monitored in cases of presumed tissue injury. All units used clinical judgment for deciding on the removal of presumed tissue cannula. All units had written guidelines on the removal of cannulae. The possibility that genetic factors play a role in susceptibility to CLD has been reported. We decided to investigate whether gene polymorphisms for tumour necrosis factor α (TNFα-308 G/A) and interleukin 1 (IL1) influence the risk of developing CLD in small preterm (<30 weeks gestation) infants. A total of 224 ventilated small preterm infants were enrolled into a case-control study to investigate the association between TNFα-308 G/A and IL1 polymorphisms in a population in Taiwan to CLD.
Lower placental weight is associated with raised cord serum insulin concentrations at birth

A growing body of evidence suggests that the malnourished fetus may develop peripheral insulin resistance and that low birth weight is a risk factor for metabolic and cardiovascular disease in adulthood. As intrauterine nutrition and fetal growth depends on the placenta, we hypothesise that low weight placenta may be linked to the increase in serum insulin concentration in small for gestational age (SGA) term newborn infants.

We compared 20 SGA babies with 40 of appropriate size for gestational age (AGA) in a cross sectional study matched by mother’s age, weight before pregnancy, weight increase throughout pregnancy, and duration of gestation. Risk factors related to retardation of fetal growth and conditions that affect glucose metabolism during labour were exclusion criteria. Gestational age >38 and <41 weeks, birth weight >10th centile, serum insulin concentration >30 pmol/l, and weight of placenta <400 g defined term babies, SGA, high serum insulin concentration, and low weight placenta.

Babies born SGA with low weight placenta (346 (19) g) had the lowest birth weight (2056 (269) g) and the highest serum insulin concentration (51.9 (10.8) pmol/l), whereas babies born SGA with placental weight >400 g (466 (65) g) had the lowest serum insulin concentration (15.9 (3.3) pmol/l) (values are mean (SD)). On the other hand, babies born AGA exhibited the highest birth weight (3362 (234) g) and placental weight (549 (82) g), with mean serum insulin concentration of 30.9 (8.6) pmol/l. Glucose concentrations were similar between the groups, and there were no hypoglycaemic events. Placental weight and serum insulin concentration showed a significant inverse correlation (fig 1).

Multivariate regression analysis of the relation between low weight placenta and high serum insulin concentration found an odds ratio of 2.1, 95% confidence interval 1.3 to 14.3, p = 0.01.

Although serum insulin concentrations are lower in lower birth weight babies, in this study SGA infants with low weight placenta had the lowest birth weight but the highest serum insulin concentration, which suggests that these babies may have developed insulin resistance in utero, a phenomenon that seems to be linked to the low weight placenta. Whether the low weight placenta causes immaturity of the placenta and/or placental dysfunction and this affects the somatotropic axis in SGA children remains to be established.

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