

Bronchopulmonary dysplasia (BPD) rates in preterm infants – is there a change with non-invasive ventilation?

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Background

- Incidence of BPD remains around 40% in developed countries using newer definition of need for supplemental oxygen or pressure at 36 weeks post menstrual age¹
- Further research suggests more reliable cut off for definition as 40 weeks post menstrual age
- There is increasing use of non-invasive ventilation reducing trauma to the developing lungs
- We wanted to compare our unit's data against UK National Neonatal Audit Programme (UK NNAP)

Methods

- Review of neonates born between January to December 2016, <32 weeks gestation, admitted to NICU at SPH
- Data collected via Evolve electronic medical records and BadgerNet database
- Babies categorised into 4 groups based on gestation and place of birth
 - Group 1: born at SPH <30 weeks
 - Group 2: born elsewhere <30 weeks
 - Group 3: born at SPH 30-32 weeks
 - Group 4: born elsewhere 30-32 weeks
- Babies were excluded if they died, transferred in for special care or other short stay in the unit

Results

- 105 eligible babies were identified
- 47 babies <30 weeks were born at SPH and 35 babies <30 weeks were born elsewhere and transferred in
- 19 babies at 30-32 weeks were born at SPH and 4 were born elsewhere and transferred in
- Table 1 shows baseline clinical characteristics.

(Mean)	Group 1	Group 2	Group 3	Group 4
Gestation (weeks)	27+4	27+3	30+2	30+4
Birthweight	960g	1040g	1567g	1340g
Ventilation BiPAP + CPAP (days)	1d	5d	0d	3d
Vapotherm (days)	25d	22d	4d	3.5d
Nasal cannula oxygen (days)	22d	16d	0d	2.5d

Table 1. Baseline clinical characteristics according to groups

- Table 2 shows risk factors for BPD and treatments received while inpatient
- Overall, our rate of BPD at 47.6% is higher than UK national average for level 3 NICUs (38%)²
- With increasing gestation we show that the rate of BPD falls. (Table 3)

- Babies in Group 4 had different pathology requiring oxygen or ventilation, not BPD. This group was also small with only 4 babies included, reflecting higher percentages.

	Group 1	Group 2	Group 3	Group 4	Overall
Antenatal steroids	93.6% (44/47)	91.4% (32/35)	100% (19/19)	75% (3/4)	95.2% (98/105)
Complete course of steroids	72.3% (34/47)	54.3% (19/35)	100% (19/19)	50% (2/4)	72.4% (74/105)
Infection risk	85.1% (40/47)	91.4% (32/35)	78.9% (15/19)	100% (4/4)	86.7% (91/105)
PPROM >7 days	29.8% (14/47)	37.1% (13/35)	36.8% (7/19)	25% (1/4)	33.3% (35/105)
Birth by LSCS	70.2% (33/47)	60% (22/35)	57.9% (11/19)	75% (3/4)	64.8% (68/105)
Surfactant	51.1%	85.7%	31.6%	100%	61%
Surfactant timing (median)	0.5h from birth	0h from birth	11h from birth	6h from birth	0h from birth
Postnatal steroids	25.5%	25.7%	10.5%	0%	21.9%
Home oxygen	38.3%	42.9%	10.5%	25%	35.2%

Table 2. Risk factors for BPD and treatment received

	28 days	36 weeks	40 weeks
Group 1	79%	62%	43%
Group 2	63%	49%	46%
Group 3	16%	16%	16%
Group 4	50%	50%	25%
Overall	60%	47.6%	37%

Table 3. Percentage of BPD rates according to different definitions

Conclusion

- Our rates of BPD are high despite non-invasive management
- Review of practice is necessary to improve outcomes. This includes earlier and effective use of surfactant, as well as streamlining treatment with postnatal steroids, and improvement in nutrition in at risk infants.
- Closer attention needs to be paid to babies nearing 36 weeks post menstrual age and review whether oxygen therapy is clinically indicated and why
- Using cut off of 40 weeks post menstrual age might prove to be more clinically relevant

References

1. Stoll B.J., Hansen N.I., Bell E.F., Shankaran S., Laptook A.R., Walsh M.C., Hale E.C., Newman N.S., Schibler K., Carlo W.A., et al. Neonatal outcomes of extremely preterm infants from the nichd neonatal research network. *Pediatrics*. 2010;126:443–456. doi: 10.1542/peds.2009-2959
2. <http://www.nnap.rcpch.ac.uk/annual-reports.aspx>