TREATMENT

Higher oxygen saturation targets did not improve growth and neurodevelopment in extremely preterm infants


Q Does maintenance of higher oxygen saturation (SpO2) targets (95–98%) improve growth and neurodevelopment compared with standard targets (91–94%) in extremely preterm infants dependent on supplemental oxygen?

MAIN RESULTS

Analysis was by intention to treat. The groups did not differ for growth outcomes or major developmental abnormalities (table), or worst retinopathy (p = 0.34). However, the higher target group had higher rates of dependence on supplemental oxygen at 36 weeks PA (table) and spent more days on oxygen (median 40 v 17.5 d, p<0.001) than those in the standard target group.

CONCLUSION

In extremely preterm infants who are dependent on supplemental oxygen, maintenance of higher oxygen saturation targets (95–98%) did not improve growth or neurodevelopment.

### METHODS:

- **Design:** randomised controlled trial.
- **Allocation:** concealed.
- **Blinding:** blinded (patients, healthcare providers, data collectors, outcome assessors, monitoring committee).
- **Follow up period:** corrected age (chronologic age plus number of wks of prematurity) at 12 months.
- **Setting:** 8 tertiary perinatal centres in Sydney, Australia.

### Patients:

358 infants (mean age 26.5 wks, 53% boys) who were born at <30 weeks gestational age and remained dependent on supplemental oxygen at 32 weeks postmenstrual age (PA). Exclusion criteria: major congenital abnormalities; major surgery or severe intracranial disorder diagnosed at <32 weeks PA; and multiple births with >3 eligible infants.

### Interventions:

Infants were stratified by hospital, singleton or multiple birth, and gestational age (22–27 wks or 28–29 wks) and allocated to higher SpO2 targets (95–98%) (n = 180) or standard SpO2 targets (91–94%) (n = 178).

### Outcomes:

- **Growth:** mean weight, length, and head circumference; and weight <10th percentile and major developmental abnormality (blindness, cerebral palsy, or a score on the revised Griffiths Mental Developmental Scales >2 standard deviations below the mean). Secondary outcomes included duration of oxygen therapy, worst retinopathy, and dependence on supplementary oxygen at 36 weeks PA.

### Patient follow up:

93%; analysis included all patients.

*Information provided by author.

### Higher oxygen saturation targets (95–98%) v standard saturation targets (91–94%) for extremely premature infants*

<table>
<thead>
<tr>
<th>Outcomes at 12 months corrected age</th>
<th>Higher targets</th>
<th>Standard targets</th>
<th>Mean difference (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>9.25</td>
<td>9.10</td>
<td>0.15 (–0.2 to 0.5)</td>
</tr>
<tr>
<td>Length (cm)</td>
<td>74.1</td>
<td>74.0</td>
<td>0.1 (–0.8 to 1.0)</td>
</tr>
<tr>
<td>Head circumference (cm)</td>
<td>46.3</td>
<td>46.3</td>
<td>0.0 (–0.4 to 0.4)</td>
</tr>
<tr>
<td>Weight &lt;10th percentile</td>
<td>33%</td>
<td>37%</td>
<td>11.4% (–34 to 19)</td>
</tr>
<tr>
<td>Major developmental abnormality</td>
<td>23%</td>
<td>24%</td>
<td>3.7% (–34 to 41)</td>
</tr>
<tr>
<td>Dependence on supplemental oxygen at 36 wks PA</td>
<td>64%</td>
<td>46%</td>
<td>40% (16 to 70)</td>
</tr>
</tbody>
</table>

*PA = postmenstrual age; other abbreviations defined in glossary. RRI, NNH, and CI calculated from data in article.

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Commentary

Increasingly, research is being done in neonatal intensive care units (NICUs) to examine clinical practices and oxygen saturation monitoring of premature infants. Most of these studies assess incidence and severity of retinopathy of prematurity (ROP) as a primary outcome. The study by Askie et al is one of the few studies that assess growth and neurodevelopmental outcomes. At 12 months corrected age, the groups did not differ for weight, length, head circumference, or frequency of major developmental abnormalities. In addition, Askie et al showed that the higher target group had increased dependence on supplemental oxygen and more days on oxygen but did not differ from the standard target group for worst ROP. However, NICUs can vary with respect to oxygen monitoring practices of their own nurseries. Although the optimal SpO2 range for extremely premature infants has not been identified, it appears that lower alarms settings (91–94%) may have benefits for infants, such as less respiratory support, without compromising growth and neurodevelopment. As recent ROP research is using even lower oxygen saturations, it would be interesting to repeat this study using targets of 85–93%.

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