Respiratory Support in Preterm Infants at Birth: the case for the new COFN policy

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The new recommendations

- CPAP immediately after birth & later selective surfactant may be considered an alternative to routine intubation with prophylactic or early surfactant in preterm infants.
- If it is likely that a ventilator will be needed, early surfactant and rapid extubation is preferable to prolonged intubation.

- Carlo & Polin, for AAP COFN
  Pediatrics 2014; 133:171

Wasn’t early surfactant proven better?

- Early trials – no CPAP
- Intubation with early surfactant vs. no or delayed surf
- So early surfactant was better than nothing, not better than CPAP

- Horbar et al, Pediatrics 1993; 92:196

The DR is a terrible place to intubate

No sedation/analgesia
No verification of ETT placement

Cold stress - plastic bag is not helping much here.
BTW - stockinette hat doesn't help
Sketchy monitoring

Often chaotic, uncontrolled situation
So if ya gotta, ya gotta – (SUPPORT = 1/3) otherwise...stabilize on CPAP and assess in NICU

Recent large trials: CPAP vs surf

<table>
<thead>
<tr>
<th></th>
<th>COIN</th>
<th>SUPPORT</th>
<th>VT-Oxford</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>610</td>
<td>1316</td>
<td>437</td>
</tr>
<tr>
<td>CPAP babies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never intubated</td>
<td>41%</td>
<td>17%</td>
<td>48%</td>
</tr>
<tr>
<td>No Surfactant</td>
<td>62%</td>
<td>33%</td>
<td>54%</td>
</tr>
<tr>
<td>Death/BPD</td>
<td>↓ 5%</td>
<td>↓ 3%</td>
<td>↓ 6%</td>
</tr>
</tbody>
</table>

COIN: Morley et al, NEJM 2008;358:700
VT/OX: Dunn et al, Pediatrics 2011;128:e1069
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Outcome death/BPD: CPAP better

<table>
<thead>
<tr>
<th>Routine</th>
<th>No routine CPAP use</th>
<th>Routine CPAP use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>31 % (29.4-41.9)</td>
<td>13 % (12.0-14.7)</td>
</tr>
<tr>
<td>BPD</td>
<td>1.3% (1.2-1.4)</td>
<td>1.3% (1.2-1.5)</td>
</tr>
</tbody>
</table>

Favors intubation –> favors CPAP


COIN: 9% CPAP vs. 3%
SUPPORT: no Δ
VT/OX: no Δ
CURPAP: 1% CPAP v. 7%
Neocosur: 3% vs. 6%
Colombian network: 9% CPAP vs. 2% + INSURE

Excluded several studies

- COIN trial: 610 babies (surfactant not given to all)
  - Morley et al, NEJM 2008;358:700
- CURPAP: 208 babies (CPAP vs. CPAP + INSURE)
  - Sandri et al, Pediatrics 2010;125:e1402–e1409
- Colombian network: 279 babies (surf after sx RDS)
- Neocosur: 256 babies (CPAP+INSURE vs. cannula)
  - Tapia et al, J Pediatr 2012;161:75-80

Other potential benefits

- Lower cost
  - No ventilator for 1/4 – 1/2 of the babies
  - No surfactant for 1/3 – 2/3 of the babies
- Less stress for babies
  - Less stressful/painful than ETT – even with nose prongs
- Less postnatal steroid use? SUPPORT yes, COIN no, others not reported

The pneumothorax question

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Is it important to start immediately? CPAP and oxygenation in preterm lambs

Q: What about “in & out” surf?
- Best of both worlds?
  - Requires intubation
  - Probably without analgesia/sedation
- VT/OX & CURPAP: no better than CPAP
- Colombian trial — ↓ air leaks, ↓ later surfactant
  - But CPAP still kept half of them from getting ANY surfactant.

Longer term outcomes
- SUPPORT patients at 18 – 22 months
  - Neurodevelopmental: no differences CPAP v surf
  - Respiratory: on q 6 month questionnaire, CPAP had:
    - Fewer episodes of “wheezing without a cold” (29 vs. 37%)
    - Fewer respiratory illnesses dx’d by MD (48 vs. 55%)
    - Fewer MD or ER visits for breathing problems (68 vs. 73%)

Q: are these results generalizable?
- RCTs required antenatal consent — biased?
- SUPPORT: pts significantly different, enrolled vs. not
  - Any antenatal steroids: 96% vs. 84% (p<0.001)
  - Full course: 72% vs. 49% (p<0.001)
  - Antenatal antibiotics: 78% vs. 65% (p<0.001)
  - DR events (e.g., Apgar<3, CPR/epi):
    - all ↓ in enrolled patients (p<0.001)
- Outcomes: ↓ death/BPD, severe IVH (p<0.001)
  - all explained by GA, BW, sex, race, center, **and antenatal steroid exposure**
  - Rich et al, Pediatrics 2012;129;480

CPAP in Malawi – the Pumani Breathing system

http://www.cnn.com/2014/03/14/health/aquarium-pump-breathing/index.html?ht=phe_j4

COFN conclusions
1. Early CPAP + later surfactant → lower rates of BPD/death compared with prophylactic or very early surfactant (LOE 1)
2. Early CPAP does not ↑ risk of adverse outcomes if surfactant is delayed or not given (LOE 1)
3. Early CPAP may lead to ↓ duration of IMV and ↓ use of postnatal steroids (LOE 1)
4. Babies and hospitals are different: individualize patient care, and consider the capabilities of health care personnel and facilities.
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Watterberg Presentation, “Respiratory Support in Preterm Infants at Birth: the case for the new COFN policy”

Reference list

1. **Committee on Fetus and Newborn; American Academy of Pediatrics Respiratory support in preterm infants at birth. Pediatrics. 2014; 133:171-4


15. Picture of neonate on CPAP in Malawi:
   http://www.cnn.com/2014/03/14/health/aquarium-pump-breathing/index.html?hpt=he_t4

**Key reading**