NASAL INTERMITTENT POSITIVE PRESSURE VENTILATION FOR PRETERM NEONATES AFTER EXTUBATION

Neonatal Department

Nasal intermittent positive pressure ventilation (NIPPV) versus nasal continuous positive airway pressure (NCPAP) for preterm neonates after extubation (Review)

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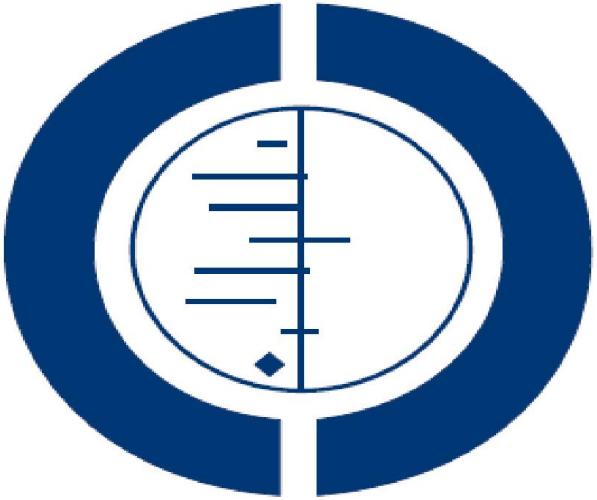

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Background

- Preterm infants experience difficulty with spontaneous breathing.
- NCPAP have shown to be useful method of respiratory support after extubation. 25% failed and require endotracheal reintubation with its risks and expense.
- NIPPV is a method of augmenting NCPAP by delivering ventilator breaths via nasal prongs.

Background

- IPPV provided by a ventilator or a bilevel device and administered via the nasal route either by short nasal prongs or nasopharyngeal tubes.

- NIPPV may be synchronised with the infant's inspiration or delivered independently of the infant's breathing efforts.

Background

Objective

- To determine the effect of NIPPV compared with NCPAP in preterm infants having their endotracheal tube removed.
- To compare the rates of gastric distension, gastrointestinal perforation, NEC, CLD and mortality between NIPPV and NCPAP.

NIPPV versus NCPAP to prevent extubation failure?

Preventing extubation failure

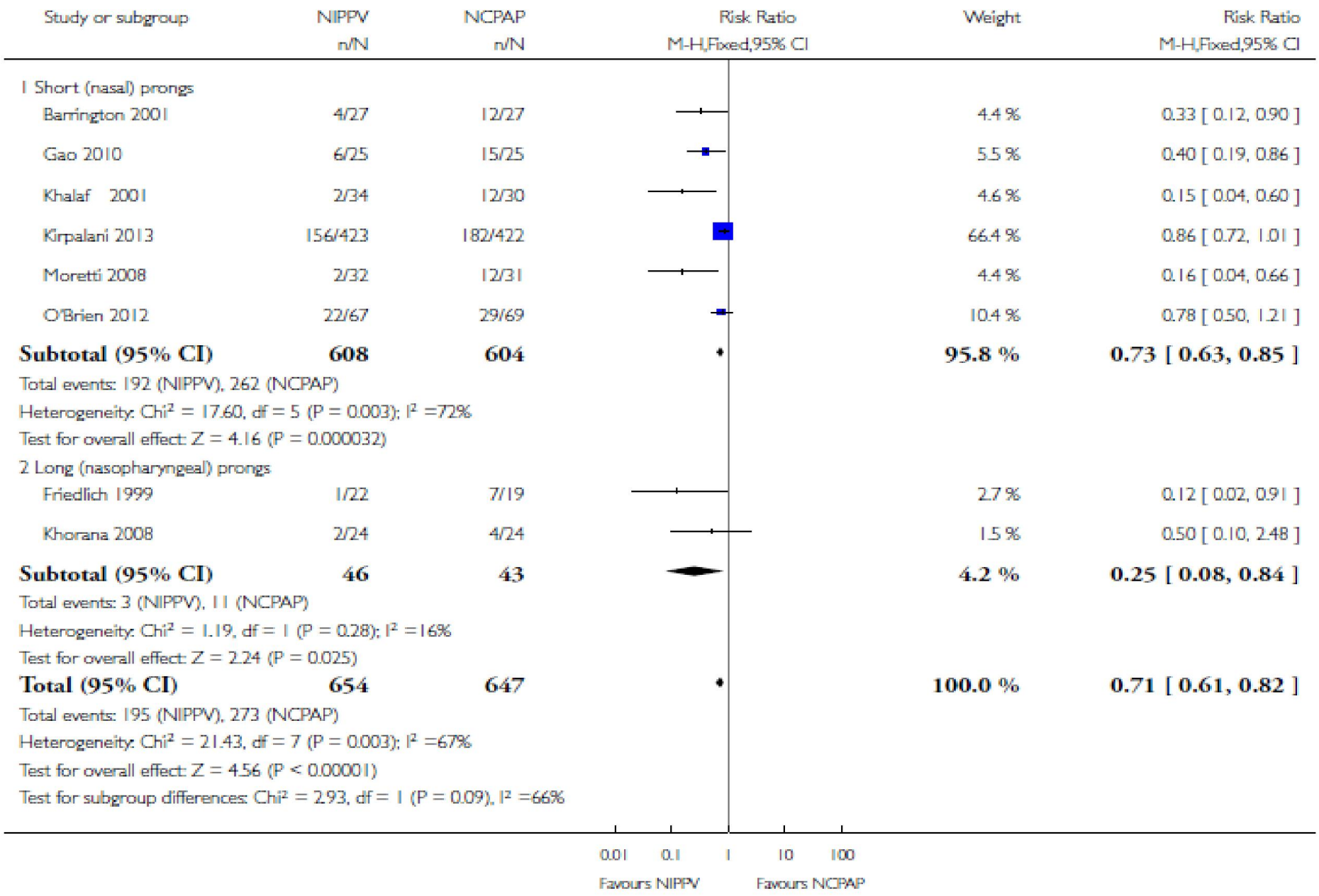
- 8 trials (N=1316 infants)
- NIPPV delivery was synchronised in five trials, one trial used non-synchronised, and another trial used mixed method.

Preventing extubation failure

- Five of the eight trials showed a statistically significant benefit for infants extubated to NIPPV in terms of respiratory failure, 48 hours to seven days post-extubation *(typical RR 0.71, 95% CI 0.61 to 0.82; typical RD -0.12, 95% CI -0.17 to -0.07)*

Comparison: 1 NIPPV versus NCPAP to prevent extubation failure

Outcome: 1 Respiratory failure post-extubation



Comparison 1. NIPPV versus NCPAP to prevent extubation failure

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Respiratory failure post-extubation	8	1301	Risk Ratio (M-H, Fixed, 95% CI)	0.71 [0.61, 0.82]
1.1 Short (nasal) prongs	6	1212	Risk Ratio (M-H, Fixed, 95% CI)	0.73 [0.63, 0.85]
1.2 Long (nasopharyngeal) prongs	2	89	Risk Ratio (M-H, Fixed, 95% CI)	0.25 [0.08, 0.84]
2 Respiratory failure post-extubation by method of NIPPV	8	1301	Risk Ratio (M-H, Fixed, 95% CI)	0.71 [0.61, 0.82]
2.1 Synchronised NIPPV	5	272	Risk Ratio (M-H, Fixed, 95% CI)	0.25 [0.15, 0.41]
2.2 Non-synchronised NIPPV	2	184	Risk Ratio (M-H, Fixed, 95% CI)	0.75 [0.49, 1.14]
2.3 Mixed method	1	845	Risk Ratio (M-H, Fixed, 95% CI)	0.86 [0.72, 1.01]
3 Respiratory failure by device type	8	1301	Risk Ratio (M-H, Fixed, 95% CI)	0.71 [0.61, 0.82]
3.1 NIPPV provided by a ventilator	6	320	Risk Ratio (M-H, Fixed, 95% CI)	0.26 [0.16, 0.43]
3.2 NIPPV provided by bilevel device	1	136	Risk Ratio (M-H, Fixed, 95% CI)	0.78 [0.50, 1.21]
3.3 NIPPV provided by mixed devices	1	845	Risk Ratio (M-H, Fixed, 95% CI)	0.86 [0.72, 1.01]
4 Endotracheal reintubation	8	1301	Risk Ratio (M-H, Fixed, 95% CI)	0.76 [0.65, 0.88]

Preventing extubation failure

- Both trials used short binasal prongs and bi-nasopharyngeal prongs were effective.
- The non-synchronised studies and the one using both methods showed no benefit of NIPPV at preventing extubation failure while the other five studies did.
- Five of the six trials using a ventilator to generate NIPPV showed a benefit of NIPPV in preventing respiratory failure post-extubation while the two trials that used bilevel or both ventilator and bilevel did not.

Pulmonary outcomes and mortality

- Infants randomised to NIPPV did not have significantly lower rates of CLD compared with infants randomised to NCPAP *(typical RR 0.97, 95% CI 0.83 to 1.14; typical RD-0.01, 95%CI -0.07 to 0.05)*
- The meta-analysis of four trials revealed no difference in mortality between treatment groups *(typical RR 0.84, 95% CI 0.56 to1.24)*

Gastrointestinal complications

Outcome	No. of studies	No. of participants	Statistical method	Effect size
Abdominal distension leading to cessation of feeds	3	136	Risk ratio (M-H, fixed, 95% CI)	1.76 [0.77, 4.05]
Gastrointestinal perforation	5	1066	Risk ratio (M-H, fixed, 95% CI)	0.94 [0.60, 1.48]
NEC	5	1147	Risk ratio (M-H, fixed, 95% CI)	0.88 [0.64,1.20]

Conclusion

- Meta-analysis demonstrated a statistically and clinical significant reduction in the risk of meeting extubation failure criteria and needing reintubation.
- There was no significant reduction in the rates of chronic lung disease, death or difference in the incidence of NEC.


Thank you