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# Synchronised nasal ventilation – where are we now?

Mechanical ventilation has been a major life saving intervention but it increases the risk of lung injury and contributes to the development of bronchopulmonary dysplasia (BPD) in preterm babies. Despite improvements in neonatal care over the past three decades the incidence of BPD has increased, perhaps because of a shift towards increased numbers of smaller survivors.

BPD incidence is lowest in centres where aggressive avoidance of mechanical ventilation is employed<sup>1</sup>. In recent years there has been a drive to minimise the time that even the smallest infants spend on mechanical ventilation in order to prevent lung injury and BPD. This has mainly been achieved using CPAP, either applied from birth during initial stabilisation or else to facilitate successful extubation following a period of mechanical ventilation via an endotracheal tube. Recent European Guidelines for the management of preterm babies with respiratory distress syndrome advocate very early surfactant use followed by rapid extubation to CPAP in order to try and reduce lung injury<sup>2</sup>. Caffeine therapy is also useful for preventing BPD, the effect probably mediated by reduction in the time needed on mechanical ventilation via an endotracheal tube<sup>3</sup>.

Extremely low birthweight (ELBW) babies who are extubated from mechanical ventilation onto CPAP have about a 40% chance of requiring reventilation within 72 hours. This is probably a result of progressive atelectasis with increased work of breathing and apnoea. Synchronised nasal intermittent positive pressure ventilation (SNIPPV) has been employed as a means of preventing this extubation failure. Using SNIPPV, a set number of positive pressure breaths are delivered for a preset inspiratory time, timed to coincide with the infant's own inspiratory efforts via the short nasal prongs that are normally used for CPAP. A meta-analysis of three randomised trials comparing SNIPPV to CPAP following extubation has reported a reduction in 72 hour reintubation rates from 40% to around 10%, however none of the studies were large enough to determine if this method of respiratory support results in any long term benefit, such as improved survival or reduction in BPD<sup>4</sup>.

Despite the paucity of data, devices such as the infant flow driver advance and SiPAP machines have crept into routine use for SNIPPV in many neonatal units in the UK<sup>5</sup>. The principle behind SNIPPV is that the extra distending breaths whilst on CPAP will reduce atelectasis and perhaps overcome apnoeic episodes by initiating spontaneous breathing by means of Head's paradoxical reflex. It is clear that SNIPPV can

prevent some babies in the short term from having to be reventilated following extubation, but it is not yet clear if the distending pressure applied through the nose is any less damaging to the lungs than pressure applied via the endotracheal tube. The results from the studies done so far are encouraging, with a trend towards reduction in BPD with babies treated with SNIPPV.

In order to properly assess the benefits and risks of SNIPPV versus CPAP a much larger study is needed. The NIPPV trial has recently received funding from the Canadian Institutes of Health Research and is hoping to enrol infants internationally, including from the UK and Ireland. This study is designed to test the hypothesis that the use of NIPPV leads to a higher rate of survival without BPD than standard therapy with nCPAP in ELBW babies. The aim is to recruit 1000 babies < 30 weeks' gestation and < 1000 g birthweight within the first four weeks of life at the time of extubation. Participants will be randomly allocated to exclusive use of NIPPV or CPAP continued throughout their hospital stay from the time of extubation until weaning from respiratory support or 36 weeks' gestational age. At 36 weeks an oxygen reduction test will determine if surviving babies have BPD. The study is powered to detect a 20 % reduction in the relative risk of survival without BPD and has just started recruitment in Canadian centres. MREC approval for UK centres is currently being sought.

If you work in a large neonatal unit that currently uses NIPPV you may wish to consider recruiting babies from within your unit for this study. Further details can be obtained from the website [www.clinicaltrials.gov](http://www.clinicaltrials.gov) and entering the trial number NCT00433212 in the search box. Alternatively contact Dr David Millar who can send a PDF of the trial protocol.

## References

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