VERY HIGH FLOW NASAL CANNULA – ALTERNATIVE TO NCPAP IN SELECT ICN PATIENTS? Frank Sanchez RRT, Katie Sabato MS, RRT, Children's Hospital & Research Center at Oakland, California

Introduction: Nasal Continuous Positive Airway Pressure (NCPAP) is a standard form of noninvasive respiratory support for neonates. However NCPAP is not always effective, and can cause complications, including nasal septal trauma and need for increased sedation. During the last year, we have used the Vapotherm nasal cannula device to provide heated, humidified gas at very high flow rates, as an alternative to traditional NCPAP in some infants. **Methods:** A trial of the very high flow, heated, humidified nasal cannula was begun in infants who were felt to be failing NCPAP, usually for one of the following reasons:

- Inability to maintain SPO2 > 88 despite NCPAP > 8 cm H2O with FIO2 > 0.60;
- Agitation, requiring increased sedation, apparently caused by NCPAP device;
- Unacceptable level of WOB while on NCPAP;
- Signs of nasal breakdown or trauma

The cannula was initially set at FIO2 0.60 with flow of 5 L/min. The flow was then adjusted to reduce the patient's WOB and/or respiratory rate. The FIO2 was then weaned to keep the SPO2 88-96%. **Results:** Between 3/04 and 7/04 patients meeting the above criteria where changed from NCPAP to very high flow nasal cannula. Data on these patients is presented in the table below. In 100% of these patients very high flow nasal cannula was judged by clinical criteria to be more effective than NCPAP. We did have one 710 gram neonate judged by clinical criteria to have failed very high flow nasal cannula, and was returned to NCPAP and proceeded to do well.

In the patients who were judged to be responders to the very high flow, heated, humidified nasal cannula, there was a dramatic decrease in FIO2, PaCO2, or need for sedation. Use of this very high flow nasal cannula did not seem to be associated with nasal trauma.

Gest@birth	Wt(kg)	NCPAP	High flow nasal cannula	Sedation	Outcome
26 wks	5.00	8 cm, FIO2 0.50-1.0	5-7LPM, FIO2 0.21-0.35	Decreased	Success
32 wks	3.80	8 cm, FIO2 0.26-0.38	10-20LPM, FIO2 0.21-0.25	Discontinued	Success
38 wks	7.00	8cm, FIO2 0.40-1.0	4-7LPM, FIO2 0.25-0.35	Discontinued	Success
34 wks	7.00	8cm, FIO2 0.30-1.0	4-8LPM, FIO2 0.24-0.30	Decreased	Success
27 wks	2.00	8cm, FIO2 0.40-0.60	6 LPM, FIO2 0.21-0.30	Discontinued	Success
27 wks	2.90	6-8cm, FIO2 0.70-1.0	5-8LPM, FIO2 0.30-0.45	Discontinued	Success
26 wks	1.78	8cm, FIO2 0.65-0.80	8 LPM, FIO2 0.21-0.30	Discontinued	Success

Discussion: This was not a randomized or controlled trial, so our results must be interpreted with caution. Many new therapies, particularly in difficult patients, are initially seen as good simply because they are new. However, we were impressed with how dramatically some patients appeared to improve when going from NCPAP to very high flow nasal cannula, humidified and heated by the Vapotherm device.

We speculate that the very high flow nasal cannula was successful in these patients because it provided an appropriate level of CPAP in a manner that was more comfortable than the standard NCPAP device. Because this approach does not use a true NCPAP device, but may merely provide NCPAP as a side effect of its high flow rate, it must be used with caution. There is no way to monitor the amount of NCPAP being delivered, and it may be possible to inadvertently generate dangerously high levels of airway pressure. It should be noted that all of the babies in whom we used it were "large" babies. **Conclusion:** Very high flow nasal cannula, using heated and humidified gas, may offer some advantages over traditional NCPAP in some patients. Controlled studies must be done to determine how it can be used most effectively and safely.

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