



Week 3: Neonatal Cardiopulmonary

Neonatal Respiratory Assessment/Support/Ventilation

Thursday, June 25 2:30-4:00 pm EDT

Moderators

Noah Hillman
Jayasree Nair

EDT	Abstract	Title	Presenting Author
2:30 pm		Introduction & General Information	
2:35 pm	3365263	Association of early continuous infusions of opioids and/or midazolam in premature infants undergoing mechanical ventilation with survival and neurodevelopmental outcomes at age 2 years	Xavier Durrmeyer
2:45 pm	3368609	A randomized cross-over comparison of leakage with prongs and nasal mask for infants on CPAP	Markus Falk
2:55 pm	3374562	Avoiding instability at birth in an extreme preterm lamb model using total liquid ventilation	Étienne Fortin-Pellerin
3:05 pm	3376649	Pulmonary-derived exosomes mediate ventilation-associated brain pyroptosis.	Laura Chavez
3:15 pm	3383332	Randomized Trial of Surfactant Therapy via Laryngeal Mask Airway vs. Brief Tracheal Intubation	Jacqueline Gallup
3:25 pm	3373327	Crossover Comparison of Tidal Volume Delivery During Nasal Intermittent Positive Pressure Ventilation in Preterm Infants: Infant Cannula vs. Nasal Continuous Positive Airway Pressure Prongs	Ashley Lynch
3:35 pm	3373162	Endotracheal bacterial colonization and changes in respiratory course for mechanically ventilated extremely premature infants	Katherine Horan
3:45 pm		Wrap Up	

Note: Schedule subject to change based on presenter availability.

Found 7 Records

CONTROL ID: 3365263

TITLE: Association of early continuous infusions of opioids and/or midazolam in premature infants undergoing mechanical ventilation with survival and neurodevelopmental outcomes at age 2 years

PRESENTER: Xavier Durrmeyer

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CURRENT CATEGORY: Neonatology

CURRENT SUBCATEGORY: Neonatal Respiratory Assessment/Support/Ventilation

KEYWORDS: analgesia/sedation, mechanical ventilation, neurodevelopment.

SESSION TITLE: Neonatal Respiratory Assessment/Support/Ventilation |Neonatal Respiratory Assessment/Support/Ventilation

SESSION TYPE: Webinar|Platform

ABSTRACT BODY:

Background: Routine analgesia and/or sedation are currently not recommended for mechanically ventilated neonates, although mechanical ventilation is likely to cause pain and discomfort. Because of widespread concerns for developmental neurotoxicity, many neonates receive mechanical ventilation without any sedation or analgesia.

Objective: To evaluate the association of early continuous infusions of opioids and/or midazolam with survival and sensorimotor outcomes at two years in ventilated premature infants.

Design/Methods: Design: Comparison of treated versus untreated infants from the French Epipage 2 cohort using inverse propensity score weighting after multiple imputation in chained equations. Treated infants received continuous opioids and/or midazolam infusions started before seven days of life and before the first extubation. Untreated infants did not receive these treatments before the first extubation or first week of life, whichever came first.

Participants: Premature infants born before 32 weeks of gestation intubated within 1 hour after birth and not extubated at 24 hours, from 66 NICUs In France between March and December 2011.

Main outcomes: The primary outcomes were survival and survival without moderate or severe neuromotor or sensory impairment at age 2. Secondary outcomes included survival without major morbidity at discharge, cumulative duration of mechanical ventilation, duration of hospital stay, cerebral palsy and Ages and Stages Questionnaire scores at age 2.

Results: Among 981 eligible infants, 922 were included (450 treated, 472 untreated; mean (SD) gestational age: 27.28 (1.95) weeks, mean birthweight: 1021 (315) g). At age 2, survival was significantly higher in the treated group (92.5% vs 87.9%, RD 4.7%; 95%CI, 0.3 to 9.1; P=.037) without any difference between treated and untreated infants for survival without moderate or severe neuromotor or sensory impairment (86.6% vs 81.3%, RD 5.3%; 95%CI -0.3 to 11.0; P=.063). Secondary outcomes were not significantly different between the treated and untreated infants.

Conclusion(s): Continuous opioids and/or midazolam infusions in very premature infants during initial mechanical ventilation that continued after 24 hours of age was associated with improved survival. Despite greater survival, opioids and/or midazolam use was not associated with increased moderate or severe neuromotor or sensory impairments at two years, supporting the long-term safety of these treatments.

(No Image Selected)

CONTROL ID: 3368609

TITLE: A randomized cross-over comparison of leakage with prongs and nasal mask for infants on CPAP

PRESENTER: Markus Falk

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CURRENT CATEGORY: Neonatology

CURRENT SUBCATEGORY: Neonatal Respiratory Assessment/Support/Ventilation

KEYWORDS: Newborn, Continuous Positive Airway Pressure, Interfaces.

SESSION TITLE: Neonatal Respiratory Assessment/Support/Ventilation |Neonatal Respiratory Assessment/Support/Ventilation

SESSION TYPE: Webinar|Platform

ABSTRACT BODY:

Background: Continuous positive airway pressure (CPAP) is the recommended first-line treatment in newborn infants with respiratory distress. Studies have shown that nasal mask has lower risk of CPAP failure and nasal injuries compared to nasal prongs. Leakage during CPAP treatment is common and, depending on device, will reduce the distending pressure and CPAP effect. Measuring leakage without affecting the child or adding dead space is challenging. Leakage is believed to be less with nasal mask but quantifying studies are scarce.

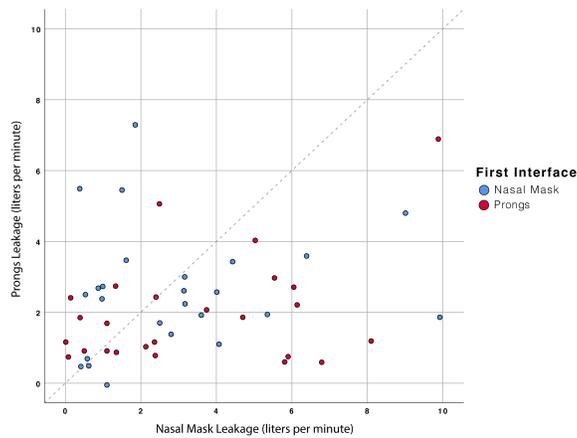
Objective: Our objective was to compare the leakage between nasal mask and prongs during neonatal CPAP treatment and evaluate leakage reducing actions.

Design/Methods: Based on earlier experiences of in-vitro tests, we developed a clinically applicable method to measure absolute leakage in neonates. The method uses the flow-through technique and has two highly sensitive flow meters placed in the patient breathing allowing real-time leakage measurements and leakages as small as 1% of the expiratory flow can be detected.

Our multi-center, randomized, cross-over study included 50 clinically stable and spontaneously breathing infants with nasal CPAP treatment, measured at an age between 28 and 44 weeks of gestational age. The interfaces were applied by a blinded nurse and leakage was measured for 30 seconds during quiet breathing. Leakage reducing actions were tested by a non-blinded investigator and included changing interface size, adjusting the interface fit by changing the angle or holding at the feeding line, adding or removing a pacifier and changing body position.

Results: The mean leakage was significantly lower with nasal prongs compared to nasal mask ($p=0.048$). For both interfaces the mean leakage could be significantly reduced ($p<0.01$).

Conclusion(s): Leakage was present during CPAP treatment in most neonates. In our study the leakage was significantly less with prongs than nasal mask and leakage could be minimized for both systems with small manual interface adjustments. Further studies on the clinical effect of leakage and how interfaces can be optimized are mandated.



Leakage for both interfaces in all cases. Color indicates first tested interface.

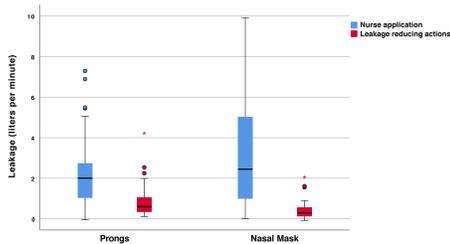


IMAGE CAPTION:

Leakage for both interfaces in all cases. Color indicates first tested interface.

CONTROL ID: 3374562

TITLE: Avoiding instability at birth in an extreme preterm lamb model using total liquid ventilation

PRESENTER: Étienne Fortin-Pellerin

AUTHORS (LAST NAME, FIRST NAME): See, Wendy²; Morin, Christophe³; Sage, Michaël⁴; Nadeau, Charlène⁵; Samson, Nathalie⁶; Praud, Jean-Paul⁷; Micheau, Philippe⁸; Fortin-Pellerin, Étienne¹

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CURRENT CATEGORY: Neonatology

CURRENT SUBCATEGORY: Neonatal Respiratory Assessment/Support/Ventilation

KEYWORDS: Liquid ventilation, Prematurity, Resuscitation.

SESSION TITLE: Neonatal Respiratory Assessment/Support/Ventilation |Neonatal Respiratory Assessment/Support/Ventilation

SESSION TYPE: Webinar|Platform

ABSTRACT BODY:

Background: Most babies born between the 22nd and 25th weeks of gestation present initial cardiorespiratory instability

requiring resuscitation and mechanical ventilation. This instability is unacceptable, associated with numerous adverse effects, yet unavoidable with the current clinical care practices. We aimed to smoothen the path to extra-uterine life using total liquid ventilation (TLV).

Objective: Compare hemoglobin oxygen saturation and cerebral oxygenation during transition to extra-uterine life using TLV or conventional gas ventilation (GV) after an EXIT procedure in an extreme preterm lamb model.

Design/Methods: Following betamethasone injection to the ewes ($n = 8$) to enhance lung maturation, eight lambs ($2.5 \pm 0.3\text{kg}$) were born by C-section at 120d of gestation (term 147d). The anaesthetized lambs were removed from the uterus but maintained on placental circulation. They were intubated with an obstructed endotracheal tube to prevent lung aeration and instrumented with a jugular venous access, cerebral Near Infra-Red Spectroscopy sensor on the head as well as a pulse oximetry sensor on the ear. Next, they were assigned to the TLV ($n = 4$) or the GV group (pressure-controlled, $n = 4$) and ventilated for 5 min before the umbilical cord was clamped. They were then ventilated for 2 hours. Exogenous surfactant was to be administered at 30 minutes if oxygen requirements reached 30%. Groups were compared using T-tests.

Results: Following umbilical cord clamping, the four lambs on GV had profound desaturation with low tidal volumes administered ($2 \pm 2 \text{ ml/kg}$) despite high peak inspiratory pressures ($28 \pm 2 \text{ cmH}_2\text{O}$) and FiO_2 100%. They all required emergency exogenous surfactant administration to ensure survival at approximately 5 minutes of life. Lambs on TLV had stable cerebral oxygenation, higher than in the GV group between the 1st and the 8th minutes following cord clamping ($p < 0.05$)(fig1). TLV also helped maintain body temperature close to normal (37.4 ± 1.1 vs 34.8 ± 0.3 °C at 30 min, $p = 0.004$, for TLV and GV, respectively). PaCO_2 tended to be higher in the TLV group at 1h (52 ± 12 vs 36 ± 7 mmHg, $p = 0.06$) but were within an acceptable range (table 1). Subjects from both groups were stable thereafter.

Conclusion(s): Transition to extra-uterine life using a combination of TLV and EXIT is uneventful, in net contrast to the current standard of care. We are currently assessing the potential of TLV for the prevention of ventilation-induced brain injury at birth.

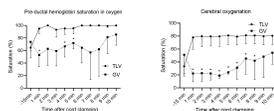


Fig1 Hemoglobin saturation and NIRS

Table 1. First blood gas at 60 minutes of life

	TLV	GV	p value
pH	7.32 ± 0.07	7.32 ± 0.09	0.99
PaCO_2	52 ± 12	36 ± 7	0.06
HCO_3^-	22 ± 3	17 ± 1	0.01

IMAGE CAPTION:

Fig1 Hemoglobin saturation and NIRS

CONTROL ID: 3376649

TITLE: Pulmonary-derived exosomes mediate ventilation-associated brain pyroptosis.

PRESENTER: Laura Chavez

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CURRENT CATEGORY: Neonatology

CURRENT SUBCATEGORY: Neonatal Respiratory Assessment/Support/Ventilation

KEYWORDS:

SESSION TITLE: Neonatal Respiratory Assessment/Support/Ventilation |Neonatal Respiratory Assessment/Support/Ventilation

SESSION TYPE: Webinar|Platform

ABSTRACT BODY:

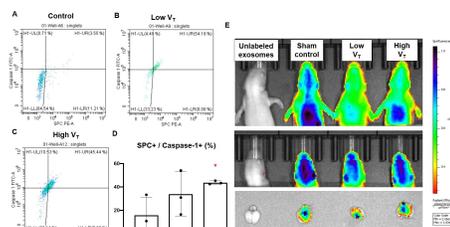
Background: Mechanical ventilation (MV) is an independent risk factor for brain injury in preterm infants. However, the mechanistic link between MV and brain injury are not known. A possible link between MV and brain injury are exosomes, extracellular vesicles that mediate intercellular communication. Exosomes can mediate pyroptosis, an inflammatory form of cell death regulated by caspase-1/ gasdermin D (GSDMD).

Objective: To determine the role of pulmonary-derived exosomes in GSDMD-mediated pyroptosis and brain injury in mechanically ventilated neonatal rats.

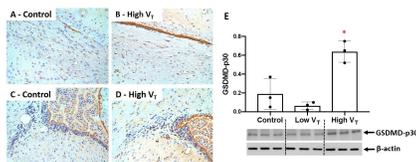
Design/Methods: Newborn rats were mechanically ventilated at postnatal day 7 with low (10 ml/kg) or high (25 ml/kg) tidal volume (Vt) for 30 min under inhaled isoflurane. During MV, we monitored heart rate, respiratory rate, oxygen saturation, and body temperature. At the end of MV, animals were extubated and returned to their nursing dam for growth under normal conditions. Serum, brain, and lung tissue were harvested at 2 weeks after ventilation. We assessed microglial activation and GSDMD expression in the brain by immunostaining and western blot. Serum exosomes were isolated, analyzed for caspase-1 expression, and adoptively transferred into normal newborn rats on postnatal day 7. The effects of these exosomes on brain inflammation and GSDMD activation in the brain were assessed at 2 weeks post-transfer.

Results: MV with high Vt caused lung injury with increased mean-linear intercept and inflammatory cell infiltration after 2 weeks. In the brain, MV with high Vt caused microglial activation, identified by changes in microglial morphology and increased IBA1 immunostaining, and increased GSDMD expression and activation in the periventricular white matter and subventricular zone. Circulating exosomes from high Vt ventilated animals had increased activated caspase-1 by western blotting. These exosomes co-expressed surfactant protein C by flow cytometry, suggesting pulmonary origin (Figure 1). In vivo imaging of labeled exosomes showed that they cross the BBB and localize to the brain. Adoptive transfer of exosomes from high Vt ventilated animals into normal newborn rats increased activation of GSDMD in the brain (Figure 2).

Conclusion(s): MV with high Vt induces lung injury and inflammation that leads to the release of caspase-1 containing exosomes from pulmonary cells that can cross the blood brain barrier and activate GSMD in the neonatal brain, suggesting a role of pulmonary-derived exosomes in ventilation-associated brain injury.



Mechanical ventilation stimulates release of SPC+ / Caspase-1+ exosomes from lung epithelial cells that cross the blood-brain barrier. FACS analysis of circulating exosomes from sham controls (A) and 2 weeks after ventilation with low Vt (B) and high Vt (C) showing an increase in the concentration of SPC+/Caspase-1+ exosomes in the circulation after high VT ventilation (D). When adoptively transferred these exosomes localize to the brain by in vivo and ex vivo imaging (E). *p<0.05 compared to control.



Adoptive transfer of exosomes isolated from rats ventilated with low and high VT ventilation into normal rats increase active GSDMD expression in the brain. A and B: white matter. C and D: subventricular zone (SVZ). E: Western blotting. Immunostaining shows that adoptive transfer of exosomes from high VT ventilated rats into normal newborn rats increased GSDMD expression (brown signal) in the white matter (B) and SVZ (D) compared to animals who received exosomes from sham control animals (A and C). Western blotting of whole brain confirms increased expression of GSDMD-p30 in animals that received exosomes from high VT ventilated animals compared to animals that received exosomes from control animals. * $p < 0.05$ compared to control.

IMAGE CAPTION:

Mechanical ventilation stimulates release of SPC⁺ / Caspase-1⁺ exosomes from lung epithelial cells that cross the blood-brain barrier. FACS analysis of circulating exosomes from sham controls (A) and 2 weeks after ventilation with low Vt (B) and high Vt (C) showing an increase in the concentration of SPC⁺/Caspase-1⁺ exosomes in the circulation after high VT ventilation (D). When adoptively transferred this exosomes localize to the brain by in vivo and ex vivo imaging (E). * $p < 0.05$ compared to control.

Adoptive transfer of exosomes isolated from rats ventilated with low and high VT ventilation into normal rats increase active GSDMD expression in the brain. A and B: white matter. C and D: subventricular zone (SVZ). E: Western blotting. Immunostaining shows that adoptive transfer of exosomes from high VT ventilated rats into normal newborn rats increased GSDMD expression (brown signal) in the white matter (B) and SVZ (D) compared to animals who received exosomes from sham control animals (A and C). Western blotting of whole brain confirms increased expression of GSDMD-p30 in animals that received exosomes from high VT ventilated animals compared to animals that received exosomes from control animals. * $p < 0.05$ compared to control.

CONTROL ID: 3383332

TITLE: Randomized Trial of Surfactant Therapy via Laryngeal Mask Airway vs. Brief Tracheal Intubation

PRESENTER: Jacqueline Aliotta Gallup

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CURRENT CATEGORY: Neonatology

CURRENT SUBCATEGORY: Neonatal Respiratory Assessment/Support/Ventilation

KEYWORDS: Surfactant, LMA, INSURE.

SESSION TITLE: Neonatal Respiratory Assessment/Support/Ventilation | Neonatal Respiratory Assessment/Support/Ventilation

SESSION TYPE: Webinar|Platform

ABSTRACT BODY:

Background: The Intubation-Surfactant-Extubation (INSURE) approach to treatment of respiratory distress syndrome (RDS) involves laryngoscopy and endotracheal tube (ETT) insertion, for which analgesic premedication is recommended. A laryngeal mask airway (LMA) is a potential alternative for surfactant administration while avoiding the need for sedation. A prior randomized trial compared surfactant given via LMA versus ETT using morphine premedication for INSURE, revealing a higher INSURE failure rate. We subsequently adopted remifentanyl for INSURE, given its short-lasting sedative effect.

Objective: To compare the efficacy of surfactant administration via LMA vs. ETT (INSURE approach with remifentanyl)

in avoiding mechanical ventilation requirement in preterm neonates with moderate RDS.

Design/Methods: Prospective, single center randomized control trial including infants born at 27 to 36 weeks gestation, ≥ 800 grams, diagnosed with RDS and on positive pressure non-invasive ventilation with FiO₂ 0.3-0.6 in the first 48 hours of age. Infants were randomized to receive surfactant via LMA or ETT. Initially, randomization ratio was 1:1; after the planned interim analysis, it was changed to 2:1 ratio LMA:ETT. Both groups received atropine premedication, and the ETT group also received remifentanyl 2 $\mu\text{g}/\text{kg}$. Primary outcome was failure of surfactant treatment to prevent need for mechanical ventilation.

Results: 88 patients were randomized, with 48 in the LMA group and 40 in the ETT group. Both groups were similar on baseline characteristics, with birth weight range of 810-3560 grams. Failure rate was 30% in the ETT group and 19% in the LMA group ($p=0.2$) [Figure 1]. This difference was due to early failures (within 1 hour), with 15% in the ETT group and 2% in the LMA group, $p=0.026$. Late failure rate did not differ between groups. The number of surfactant doses administered per patient was similar in both arms (mean 1.6 in both groups). The efficacy of surfactant in decreasing FiO₂ was similar in both groups. The rates of adverse events, including pneumothorax, BPD diagnosis and mortality, did not differ between groups.

Conclusion(s): Surfactant therapy via LMA had similar clinical efficacy to ETT administration using INSURE with remifentanyl, and a comparable secondary outcome profile. The decrease in early failures in the LMA group suggests that LMA use may avoid adverse effects of premedication, laryngoscopy and/or intubation for surfactant administration.

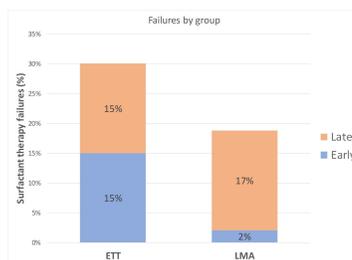


IMAGE CAPTION:

CONTROL ID: 3373327

TITLE: Crossover Comparison of Tidal Volume Delivery During Nasal Intermittent Positive Pressure Ventilation in Preterm Infants: Infant Cannula vs. Nasal Continuous Positive Airway Pressure Prongs

PRESENTER: Ashley Lauren Lynch

AUTHORS (LAST NAME, FIRST NAME): Lynch, Ashley L.¹; Matlock, David N.²; Comtois, Norman⁴; Beck, Jennifer⁴; Sinderby, Christer⁴; Courtney, Sherry³

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CURRENT CATEGORY: Neonatology

CURRENT SUBCATEGORY: Neonatal Respiratory Assessment/Support/Ventilation

KEYWORDS: cannula, nasal CPAP, tidal volume.

SESSION TITLE: Neonatal Respiratory Assessment/Support/Ventilation |Neonatal Respiratory Assessment/Support/Ventilation

SESSION TYPE: Webinar|Platform

ABSTRACT BODY:

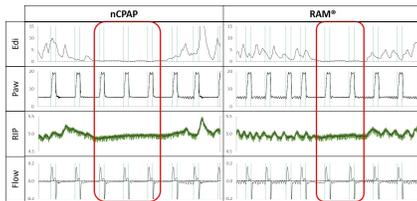
Background: Nasal intermittent positive pressure ventilation (NIPPV) is often used as an escalation from nasal continuous positive airway pressure (nCPAP) and an alternative to invasive ventilation in preterm infants. Many interfaces have been used for NIPPV delivery, and controversy exists regarding which, if any, delivers tidal volume (V_t) support.

Objective: To measure V_t delivery during NIPPV with two nasal interfaces: infant cannula and nCPAP prongs. Secondary objectives were to evaluate the effect of the interface on pressure and flow delivery, heart rate, oxygen saturation, electrical activity of the diaphragm (Edi), and transcutaneous PCO_2 and PO_2 measurements.

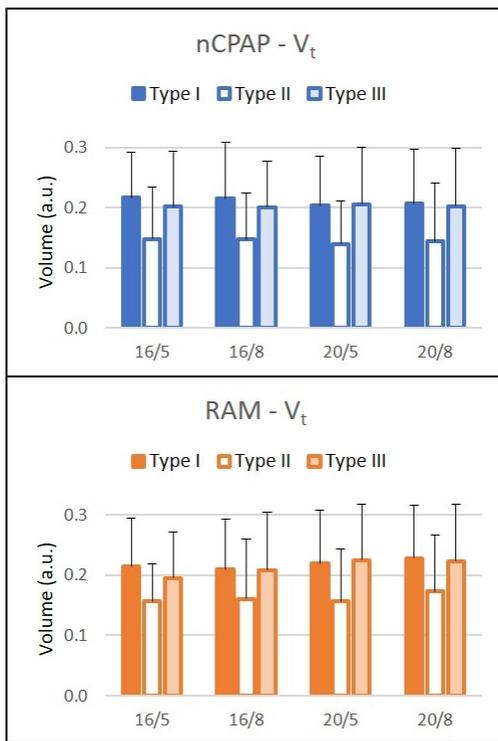
Design/Methods: We conducted a crossover study of neonates with mild respiratory distress receiving NIPPV. Infants served as their own controls and were randomized to initial interface of either RAM® cannula or Miniflow® nCPAP prongs. After 10 minutes of stabilization, infants received 5 minutes of NIPPV on each of a sequence of four pressure settings (expressed as peak inspiratory pressure / positive end expiratory pressure): 16/5, 16/8, 20/5, 20/8. This sequence was not randomized and was constant between interfaces. Subjects were then placed on the alternate interface, and the sequence was repeated. Relative V_t (arbitrary units, a.u.) was obtained using respiratory inductance plethysmography (RIP) bands around the chest and abdomen. Patient respiratory effort was assessed with an Edi catheter, measuring electric activity of the diaphragm. Data were continuously and simultaneously acquired using the MP100 Biopac data acquisition system. Events ("breaths") were separated into 3 types: patient effort synchronized with NIPPV breaths (type I), NIPPV breaths without patient effort (type II), and patient effort without NIPPV breaths (type III).

Results: Eleven patients were enrolled. Type II breaths delivered no significant V_t (Figure 1). For RAM® vs. nCPAP prongs, no significant difference was measured in relative V_t delivery between the two interfaces regardless of breath type (Figure 2a and b).

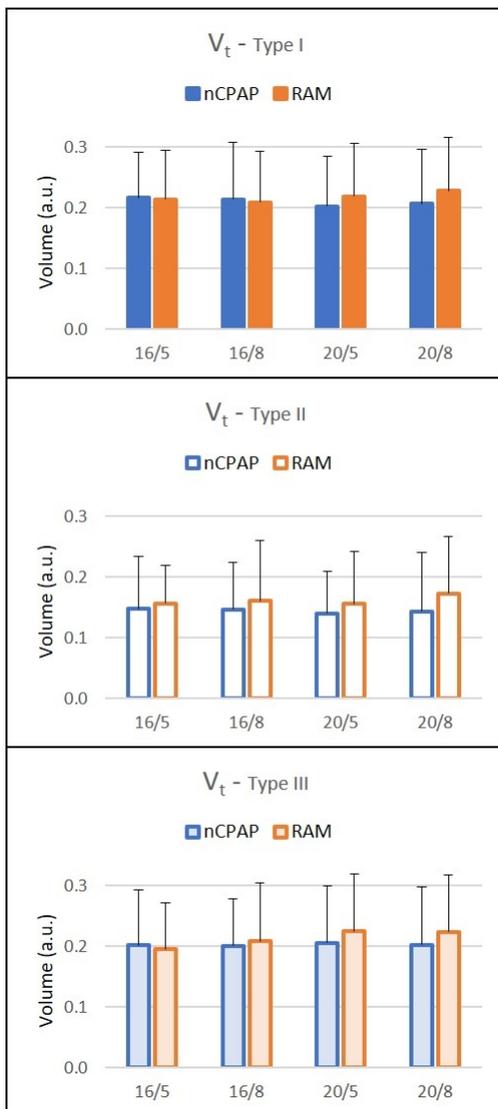
Conclusion(s): NIPPV did not deliver either clinically or statistically significant V_t between infant cannula or nCPAP prongs. NIPPV without patient effort delivered minimal, if any, V_t . Any effect of NIPPV compared to nCPAP is possibly due to a relative increase in mean airway pressure.



Example data tracings for both nCPAP and RAM® showing ventilator assist breaths in absence of Edi with associated lack of change in RIP (V_t).



V_t for breath type II was significantly less than V_t for types I and III at all pressure settings with both nCPAP and RAM®, $p < 0.05$.



V_t for all breath types was not significantly different between interfaces.

IMAGE CAPTION:

Example data tracings for both nCPAP and RAM® showing ventilator assist breaths in absence of Edi with associated lack of change in RIP (V_t).

V_t for breath type II was significantly less than V_t for types I and III at all pressure settings with both nCPAP and RAM®, $p < 0.05$.

V_t for all breath types was not significantly different between interfaces.

CONTROL ID: 3373162

TITLE: Endotracheal bacterial colonization and changes in respiratory course for mechanically ventilated extremely premature infants

PRESENTER: Katherine Mary Horan

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CURRENT CATEGORY: Neonatology

CURRENT SUBCATEGORY: Neonatal Respiratory Assessment/Support/Ventilation

KEYWORDS:

SESSION TITLE: Neonatal Respiratory Assessment/Support/Ventilation |Neonatal Respiratory Assessment/Support/Ventilation

SESSION TYPE: Webinar|Platform

ABSTRACT BODY:

Background: A large proportion of extremely premature infants demonstrate a biphasic respiratory course with an initial improvement during the first week after birth followed by a gradual deterioration during the following weeks. The role of airway colonization as a potential factor that may contribute to this secondary respiratory deterioration has not been previously investigated.

Objective: To explore the temporal association between airway colonization and the respiratory course during the first two postnatal weeks in a cohort of extreme premature infants receiving invasive mechanical ventilation (MV).

Design/Methods: Data from an observational cohort of premature infants born at 22-28w of gestation admitted to the NICU at Holtz Children's Hospital of the University of Miami/Jackson Memorial Medical Center from 2005-2019, included demographics, clinical and weekly surveillance sampling for endotracheal colonization. Infants in the cohort received MV for 7 days or more during the first 2 weeks. Infants were classified as being colonized with gram positive (GP Colonized) or gram negative organisms (GN colonized). Respiratory deterioration reflected in an increased need for supplemental oxygen was defined as a greater than 25% change in the mean FiO₂ from days 4-7 to days 8-14.

Results: A total of 424 infants were included. During the first 14 days a total of 95 (22%) infants were GN colonized and 185 (44%) GP colonized and 24(6%) were colonized with both GN and GP organisms. GN colonized infants had a greater percentage increase in FiO₂ from d4-7 to d8-14 (43% vs 29%) compared to non-GN colonized infants (table 1). GN colonized infants were also more likely to have respiratory deterioration with more than 25% increase in the FiO₂ from d4-7 to d8-14 as compared to non-GN colonized infants (69.5% vs 48.6%, OR 2.19 [1.33-3.59] p<.01, Figure 1). There was no significant difference in the proportion of infants with respiratory deterioration during this period for GP colonized infants.

Conclusion(s): Early airway colonization with GN bacteria correlated with a significant deterioration in early respiratory course as shown by the increase in oxygen requirement during the second postnatal week. The unique and notable breadth of available data helps to shed light on the pathophysiology of airway colonization and respiratory course. Further studies are indicated to understand the mechanisms of injury and contribute to advances in clinical practice for this highly vulnerable population.

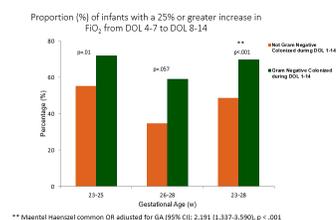


Figure 1.

Table 1.

	Gram Negative (GN) Colonization d1-14			Gram Positive (GP) Colonization d1-14		
	Yes (n=95)	No (n=329)	p	Yes (n=185)	No (n=239)	p
Infants with a $\geq 25\%$ change in FiO ₂ from d4-7 to d8-14	66 (70)	160 (49)	p<.01**	26 (47)	200 (54)	p=.33
% change in FiO ₂ d4-7 to d8-14	43 \pm 44	29 \pm 36	p=.02	32 \pm 36	33 \pm 40	p=.75

Data reported as number (%) or mean \pm SD

** Maentel Haenszel common OR adjusted for GA (95% CI): 2.191 (1.337-3.590), p < .001

IMAGE CAPTION:

Figure 1.

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