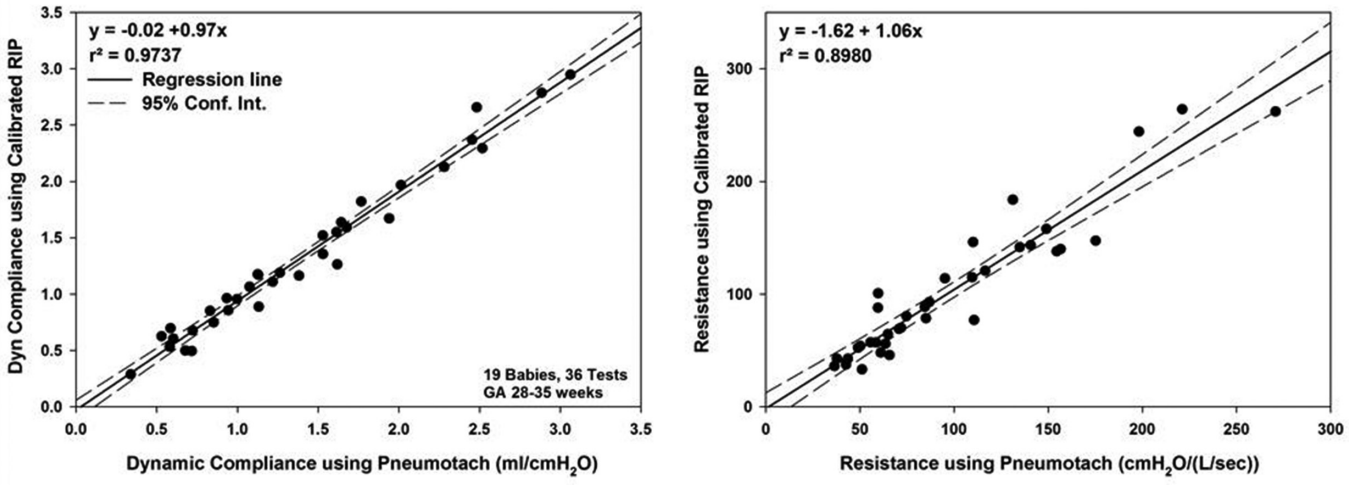

Abstract O-077 Figure 1

linear regression algorithms on artefact-free breaths with amplitudes within the mean±1SD. A sequence of optimising iterations for computer breath selection produced best-fit regression coefficients with the PNT flow. Transpulmonary pressure was measured by esophageal catheter. Lung compliance and airway resistance were computed by a least mean square technique. Ribcage to abdominal phase angle (phi), Laboured breathing index (LBI), and phase relation in total breath (PhRTB) were computed from analysis of RIP ribcage and abdomen excursions. Validation measurements were performed on 18 infants of 28–35wks GA.

Results Correlation coefficients for compliance and resistance by PNT vs. RIP were r^2=0.9737 and 0.8980 respectively. LBI for these infants was 1.2 ± 0.6, phi was 54.4 ± 7.4 degrees and PhRTB was 33.4 ± 3.1%.

Conclusion When properly calibrated, RIP derived respiratory mechanics measurements provide sufficient diagnostic accuracy in infants receiving NIV support.

O-078 NEONATAL CHEST ULTRASOUND PREDICTS NON INVASIVE VENTILATION FAILURE IN PRETERM INFANTS

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Background Non invasive ventilation is the treatment of choice for neonatal moderate respiratory distress (RD). Predictors of nasal ventilation failure may be helpful in preventing clinical deterioration. Work on neonatal lung ultrasound has shown that the persistence of a hyperechogenic, "white lung" image correlates with severe distress in the preterm infant. In the present study we investigate the persistent white lung ultrasound image as a marker of non invasive ventilation failure.

Methods Newborns admitted to the Neonatal Intensive Care Unit with moderate RD and stabilised on nasal continuous positive airway pressure for 120 min were enrolled. Lung ultrasound was performed and blindly classified as Type 1 (white lung), Type 2 (prevalence of B-lines), or Type 3 (prevalence of A-lines). Chest radiograph was also examined and graded by an experienced radiologist blind to the infant's clinical condition. Main outcome of the study was the accuracy of bilateral Type 1 to predict intubation within 24 h from scanning. Secondary outcome was the performance of the highest radiographic grade within the same time interval.

Results Fifty-four preterm infants were enrolled (gestational age 32.5 ± 2.6 weeks; birthweight 1703 ± 583 grams). Type 1 lung profile showed sensitivity 88.9% (95% CI 67.2–96.8), specificity 100% (CI 94.9–100), PPV 100% (CI 80.6–100), NPV 94.7% (CI 82.7–98.5). Chest radiograph had sensitivity 38.9% (95% CI 20–61.1), specificity 77.8% (CI 61.7–88.5), PPV 46.7% (CI 24.8–69.9), NPV 71.8% (CI 56.2–83.4).

Conclusions After a 2 h nasal ventilation trial, neonatal lung ultrasound is a useful predictor of the need for intubation, largely outperforming conventional radiology. Future studies should address whether including ultrasonography in the management of neonatal moderate RD confers clinical advantages.

O-079 NASAL CONTINUOUS POSITIVE AIRWAY PRESSURE AND CARDIAC FUNCTION IN PRETERM INFANTS WITH LUNG DISEASE

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Introduction Previous studies of infants on ventilatory support suggest that right ventricular output (RVO) decreases with increasing mean airway pressure. This may be due to increased pressure in the thoracic cavity. We investigated changes in cardiac output (CO) at different levels of nasal continuous positive airway pressure (nCPAP) in preterm infants with evolving chronic lung disease.

Methods We studied infants between 28 and 34 weeks corrected gestational age, a minimum of two weeks old, treated with nCPAP of 5 to 7 cm H_2O, with an O_2 requirement of 25–40%, in whom written parental consent was obtained. Infants with significant cardiac shunts were excluded. Infants were randomly assigned to nCPAP levels of 4, 6, and 8 cm H_2O for 15 min each. Right and left ventricular output, left pulmonary artery flow, superior vena cava flow, heart rate and blood pressure were measured after each change with a Vivid-I ultrasound machine by a single examiner (FB) blinded to nCPAP levels.

Abstract O-079 Table 1 Demographics of Study Population (n = 30)

GA at time of study	31.7 (30.7, 33.5)
Postnatal age in days	43 (23.5, 53.5)
Weight in kg at time of study	1.4 (1.1, 1.6)
Insignificant PDA/PFO	6/8
Surfactant (given at birth / 2nd dose)	25/7
Ventilated before study	27
Bubble CPAP /ventilator CPAP	24/6
CPAP requirement (5/6/7 cm H_2O))	13/7/10
O_2 requirement (%)	30 (25,30)
Capillary gas: pH	7.35 (7.34, 7.39)
Capillary gas: pCO_2 (mmHg)	53 (47, 55)
Capillary gas: HCO_3^- (mmol/l)	29 (25, 34)
Capillary gas: base excess	2.6 (-0.4, 4.8)
Respiratory support at 36 weeks GA	12
O_2 requirement at 36 weeks GA	25

Values given as median (IQR) or absolute numbers.

Abstract O-079 Table 2 Haemodynamic parameters on three nCPAP levels

	4 cm H_2O	6 cm H_2O	8 cm H_2O	p
RVO (ml/kg/min)	411 ± 110	418 ± 94	414 ± 93	0.98
LVO (ml/kg/min)	407 ± 121	405 ± 140	403 ± 123	0.96
SVC flow (ml/kg/min)	157 ± 53	149 ± 4	155 ± 42	0.58
LPA flow (ml/kg/min)	136 ± 57	142 ± 61	136 ± 53	0.45
TAPSE (mm)	7.9 ± 1.8	8.1 ± 1.5	8.0 ± 1.2	0.58
BP systolic (mmHg)	73 ± 9	71 ± 9	74 ± 13	0.34
BP mean (mmHg)	52 ± 9	53 ± 8	55 ± 11	0.28
BP diastolic (mmHg)	40 ± 1	43 ± 1	46 ± 12	0.11
HR (beats/min)	163 ± 13	164 ± 13	162 ± 13	0.62

Results Thirty infants with a median (IQR) gestational age of 25.9 (25.6–26.8) weeks and a birth weight of 0.78 (0.66–0.94) kg were studied at a median age of 43 (24–53) days. There were no significant differences in any cardiovascular parameters at different levels of nCPAP.

Discussion We conclude that nCPAP levels between 4 and 8 cm H_2O did not have an effect on CO in our study population of stable preterm infants with evolving chronic lung disease.

Nosocomial Infections in the ICU

O-080 ELEVATED SOLUBLE THROMBOMODULIN IS ASSOCIATED WITH INCREASED MORTALITY AMONG CHILDREN WITH INDIRECT ACUTE RESPIRATORY DISTRESS SYNDROME (ARDS)

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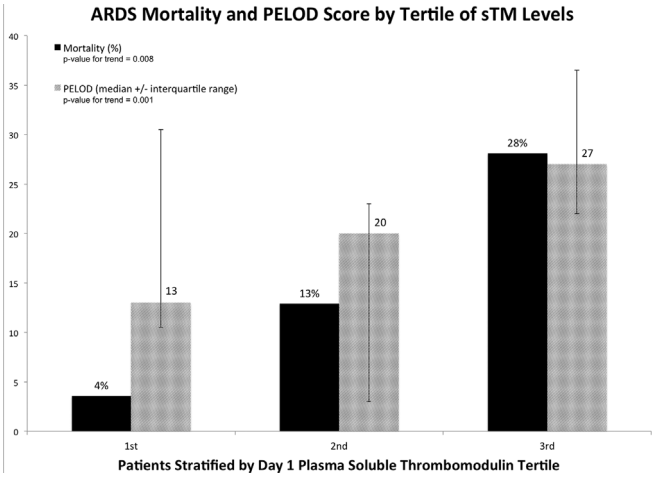
Abstract O-080 Table 1 Cohort characteristics comparing Direct and Indirect Injury-related ARDS

	Direct (n=133)	Indirect (n=91)
Age (y)	6.2	7.5
Male (%)	58	51
White (%)	62	66
Pneumonia	124	0
Aspiration	9	0
Sepsis	0	46
Trauma	0	13
Multiple Transfusions and others	0	32
Vasopressor Use (p=0.001)	33	55
PRISM II (SD)	16 (10)	13 (9)
PELOD (SD)	19 (12)	21 (14)
Mortality (%)	12	15



Abstract O-080 Figure 1 ARDS Mortality and PELOD Score by Tertile of sTM Levels

Background Inflammation and endothelial damage accelerate cleavage of endothelium bound Thrombomodulin (TM). Elevated soluble TM (sTM) in plasma is associated with adverse outcomes in sepsis and DIC in adults, but this has not been studied among children with ARDS.

Objective Test the relationship of plasma sTM with clinical outcomes in paediatric ARDS.

Design/methods We measured sTM in plasma collected within 24 h of onset of ARDS (diagnosed by Berlin criteria) in an ongoing multi-centre observational cohort. We used non-parametric Mann-Whitney and trend tests, and regression models.

Results Baseline characteristics of study population are shown in Table. Among children with indirect lung injury, mean sTM levels were higher in non-survivors [241 ng/mL (102–134)] compared to survivors [118 ng/mL (107–374)] (p = 0.004). Mortality and Paediatric Logistic Organ Dysfunction (PELOD) score increased stepwise by tertile of plasma sTM (figure). On logistic regression, the odds of death increased by 4.5 for every log increase in plasma sTM and the association was independent of age, race, gender and severity of illness. No such relationship existed for direct ARDS.

Conclusions Higher plasma sTM is associated with increased mortality and organ failure in children with indirect ARDS. This supports the importance of endothelial injury and TM in pathobiology of indirect ARDS and suggests that early elevation in plasma sTM is an independent risk factor for mortality.