SPiN 2016

Sharing Progress in Neonatology

including

31st International Workshop on Surfactant Replacement

Naples, Italy

June 3rd- 4th 2016

Scientific Programme

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SCIENTIFIC COMMITTEE

Tore Curstedt *(Stockholm, Sweden)*
Henry L. Halliday *(Belfast, UK)*
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Eric Shinwell *(Tel Aviv and Tsfat, Israel)*
Christian P. Speer *(Würzburg, Germany)*
Bo Sun *(Shanghai, China)*
David Sweet *(Belfast, UK)*

INVITED SPEAKERS

Karel Allegaert *(Leuven, Belgium)*
Virgilio Carnielli *(Ancona, Italy)*
Donna Ferriero *(San Francisco, USA)*
Pierre Gressens *(Paris, France)*
Petra Huppi *(Geneva, Switzerland)*
Gianluca Lista *(Milan Italy)*
Corrado Moretti *(Rome, Italy)*
Won Soon Park *(Seoul, South Korea)*
Francesco Raimondi *(Napoli, Italy)*
Rangasamy Ramanathan *(Los Angeles, USA)*
Robin Steinhorn *(Washingston, USA)*
Ben Stenson *(Edimburgh, United Kingdom)*
David Sweet *(Belfast, United Kingdom)*

Dear Friends and colleagues,

Welcome to the first edition of SPIN - Sharing Progress in Neonatology including the 31st International Workshop on Surfactant Replacement.

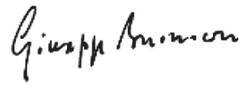
I am very pleased to welcome you in my home region. I was born in Amalfi (the first Italian maritime republic), which is nowadays a beautiful town very close to Napoli.

As mentioned in the Congress title, we aim to share the progresses achieved in Neonatology, particularly focusing on brain injury and development and on lung diseases.
We are very lucky to have 36 well-known speakers from all over of the world who will discuss cutting edge issues in the field of the vulnerable newborn brain, neuroimaging, stem cell treatment, pulmonary circulation, retinopathy of prematurity, new non-invasive ventilation strategies, new guidelines on RDS, bronco-pulmonary dysplasia, the appropriate level of oxygen etc.
We have almost 400 attendees from 53 Countries and different Continents attending the meeting. In spite of the changes in the title of the Congress, we assure to keep the traditional workshop style in a very friendly atmosphere.
This meeting is characterized by wide interactions between speakers and delegates to allow an active debate on basic and clinical issues aimed at improving the quality of care of sick newborns and preterm babies.

We wish you to come back home with better approaches to everyday clinical problems, that probably constitute one of the most important achievements of this meeting.

Both the Organizing Committee and I, as President of this Workshop, wish you a memorable meeting, and we hope you enjoy it in a very charming cornice and atmosphere.

Prof. Giuseppe Buonocore
President of SPIN 2016



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Naples, Italy
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Friday, June 3rd 2016

08.30 – 08.40 **WELCOME ADDRESS**
Giuseppe Buonocore *(Siena, Italy)*

Chairpersons: Tore Curstedt *(Stockholm, Sweden)*, Henry Halliday *(Belfast, United Kingdom)*

08.40 – 08.50 **INTRODUCTION**
Tore Curstedt *(Stockholm, Sweden)*

08.50 – 09.20 8th BENGT ROBERTSON MEMORIAL LECTURE
NEONATAL RESPIRATORY DISEASES IN THE NEWBORN INFANT: NOVEL INSIGHTS FROM STABLE ISOTOPE TRACER STUDIES
Virgilio Carnielli *(Ancona, Italy)*

Chairpersons: Mikko Hallman *(Oulu, Finland)*, Bo Sun *(Shanghai, China)*

Invited Lecture

09.20 – 09.50 ADVANCES IN NEONATAL PULMONARY HYPERTENSION
Robin Steinhorn *(Washington, USA)*

09.50 – 10.00 Discussion

Oral Presentations

10.00 – 10.15 ANTI-INFLAMMATORY EFFECTS OF THE NEW GENERATION SYNTHETIC SURFACTANT CHF5633 ON UREAPLASMA-INDUCED PRO-INFLAMMATORY CYTOKINE RESPONSE IN HUMAN NEONATAL AND ADULT MONOCYTES
K. Glaser; M. Fehrholz; H. Claus; C. P. Speer *(Würzburg, Germany)*

10.15 – 10.30 EFFECT OF INDUCED HYPOTHERMIA ON LIPOPOLYSACCHARIDE-INDUCED LUNG INJURY IN NEONATAL RATS
F. Tuzun; C. Altınsoy; N. Duman; A.H. Sever; M. Dilek; S. Ozbal; B.U. Ergur; D.C. Yesilirmak; O. Yılmaz; A. Kumral; H. Ozkan *(Dokuz Eylul University, Izmir, Turkey)*

10.30 – 10.45 NEONATAL OUTCOME OF SMALL FOR GESTATIONAL AGE PRETERM INFANTS
S. Nobile; P. Marchionni; P. E. Cogo; V. P. Carnielli *(Ancona, Italy)*

10.45 – 11.15 Coffee Break

Chairpersons: Pierre Gressens *(Paris, France)*, Petra Huppi *(Geneva, Switzerland)*

Invited Lecture

11.15 – 11.45 THE VULNERABLE NEWBORN BRAIN- IMAGING PATTERNS OF ACQUIRED INJURY
Donna Ferriero *(San Francisco, USA)*

11.45 – 11.55 Discussion

Oral Presentations

11:55 – 12:10 NEW PROTOCOL "FIRST DAY STABILISATION OF VERY PREMATURE BABIES". RESULTS OF IMPLEMENTATION
O.V. Ionov; A.R. Kirtbaya; E.N. Balashova; I.V. Nikitina; A.A. Lenushkina; D.S. Kryuchko; A.Y. Ryndin; V.V. Zubkov; D.N. Degtyarev *(Moscow, Russia)*

12:10 – 12:25 KETAMINE USE FOR PROCEDURAL SEDATION IN NICUS – A POPULATION PK STUDY BASED ON NOVEL DBS SAMPLING
J Courtney; M. Alsous; A. Hawwa; J. McElnay; H. Halliday; D.G. Sweet *(Belfast, United Kingdom)*

12:25 – 12:40 PULMONARY AND CEREBRAL EFFECTS OF A NEW SYNTHETIC SURFACTANT (CHF-5633) ADMINISTRATION IN PREMATURE LAMBS
C. Rey-Santano; M. Gomez-Solaetxe; X. Murgia; F. Salomone; F. Bianco; N. Pelizzi; J. López de Heredia; V.E. Mielgo *(Barakaldo, Spain; Parma, Italy)*

12:40 - 12:55 RELATIONSHIP BETWEEN THE GRADE OF PAIN AND OXIDATIVE STRESS INJURY IN THE NEWBORN
S. Negro; S. Perrone; M. Riccitelli; A. Tuccio; C.V. Bellieni; A. Santacroce; G. Stazzoni; F. Proietti; F. Bazzini; G. Buonocore *(Siena, Italy)*

12.55 – 14.45 Lunch and Poster Viewing

13.30 – 14.45 ***Poster Presentations 1***

Chairpersons: David Sweet *(Belfast, United Kingdom)*, Eric Shinwell *(Tel Aviv and Tsfat, Israel)*

Poster 1 FROM MOUSE DEVELOPMENT TO SHEEP LUNG INJURY
N. Bhopal; C. Li; M. J. Dahl; K. Albertine; D. Mathur; R. Ramanathan1; P. Minoo *(Los Angeles, USA; Salt Lake City, USA)*

Poster 2 BROAD SPECTRUM GENETIC DIAGNOSIS FOR PULMONARY CILIARY DYSKINESIA BY TARGETED NEXT GENERATION SEQUENCING
O. Danhaive, D. Peca, N. Ullmann, A. Angioni, R. Boldrini, R. Cutrera *(San Francisco, USA; Rome, Italy)*

Poster 3 NASAL INTERMITTENT POSITIVE PRESSURE VENTILATION VERSUS BI-LEVEL CPAP FOLLOWING EXTUBATION IN INFANTS ≤ 1250 G BIRTHWEIGHT
N. Okur, M. Buyuktiryaki, F.N. Sari, E. Alyamac Dizdar, N. Uras, F.E. Canpolat, S.S. Oguz *(Ankara, Turkey)*

Poster 4 SURFACTANT AND ASSISTED VENTILATION REDUCED THE MORTALITY OF NEONATES WITH HYPOXEMIC RESPIRATORY FAILURE AND A BIRTH WEIGHT >1500 G
B. Sun; H. Wang; X. Gao; C. Liu; C. Yan; X. Lin on behalf of Chinese Collaborative Study Group for Neonatal Respiratory Diseases *(Shanghai, China; Changsha, China; Shijiazhuang; China; Changchun, China; Xiamen, China)*

Poster 5 LESS INVASIVE SURFACTANT ADMINISTRATION IN THE NORDICS - A SURVEY
C. Heiring; B. Jonsson; S. Andersson; L. Björklund *(Copenhagen, Denmark; Stockholm, Sweden; Helsinki, Finland; Lund, Sweden)*

Poster 6 COMPARISON OF THE EFFECTS OF DIFFERENT INITIAL DOSES OF PORACTANT ON TISSUE OXYGENATION IN EXTREMELY PRETERM INFANTS
M. Cetinkaya; A. Babayigit; B. Cebeci; S. Yilmaz Semerci; H. Ozkan; N.Koksal *(Istambul, Turkey; Bursa, Turkey)*

Poster 7 THE INFLUENCE OF INSPIRATORY TIME ON THE EFFICIENCY OF NON-INVASIVE VENTILATION IN PRETERM INFANTS
O.V. Ionov; A.R. Kirtbaya; T.A. Kosinova; E.N. Balashova; A.Y. Ryndin; E.M. Nefedova; V.V. Zubkov; D.N. Degtyarev *(Moscow, Russia)*

Poster 8 THE EFFECTIVENESS OF INHALED SALBUTAMOL IN TRANSIENT TACHYPNEA OF THE NEWBORN
E. Peker; O. Tuncer; M. Akil; N. Demir *(Van, Turkey)*

Poster 9 LESS INVASIVE SURFACTANT ADMINISTRATION IN VERY LOW BIRTH WEIGHT INFANTS: NIPPV OR NCPAP?
S.A. Özdemir; E. A. Özer; Ö. İlhan; S. Sütçüoğlu; M. M. Tatlı *(İzmir, Turkey; Muğla, Turkey)*

Poster 10 WELL-DIFFERENTIATED PRIMARY NASAL EPITHELIAL CELL (WD-PNEC) CULTURES DERIVED FROM NEWBORN TERM AND PRETERM INFANTS: AN EXCITING OPPORTUNITY TO STUDY AIRWAY INNATE IMMUNE RESPONSES IN AT RISK GROUPS
H. Groves 1; H. Guo-Parke; L. Broadbent; M. D. Shields; U. F. Power *Belfast, United Kingdom)*

Poster 11 LESS INVASIVE SURFACTANT APPLICATION VS CONVENTIONAL THERAPY IN EXTREMELY PRETERM INFANTS
I. Štucin Gantar, M. Slabe *(Ljubljana, Slovenia)*

Poster 12 HAEMODYNAMIC EFFECT OF LESS INVASIVE SURFACTANT ADMINISTRATION
D. Van Laere; H. Blom; M. Meeus; S. Laroche; L. Mahieu; P. Van Reempts; M. Voeten *(Antwerpen, Belgium)*

Chairpersons: Giuseppe Buonocore *(Siena, Italy)*, Kajsa Bohlin *(Stockholm, Sweden)*

Invited Lecture

14.45 – 15.15 EUROPEAN GUIDELINES FOR THE MANAGEMENT OF RDS - 2016 UPDATE
David Sweet *(Belfast, United Kingdom)*

15:15 – 15.30 Discussion

Oral Presentations

15.30 – 15.45 A GENOME-WIDE ASSOCIATION STUDY IDENTIFIES CRP AS A RISK FACTOR FOR BRONCHOPULMONARY DYSPLASIA
M. Mahlman; M. K. Karjalainen; M. Rämet; M. Hallman, on behalf of the Gen-BPD Study Group *(Oulu, Finland; Tampere, Finland)*

15.45 – 16.00 EFFICACY OF INHALED NITRIC OXIDE IN VENTILATED PRETERM RABBIT LUNGS UNDER HYPEROXIC, NORMOXIC AND HYPOXIC CONDITIONS
B. Sun; L. Zhang *(Shanghai, China)*

16.00 – 16.15 EXPLORING THE BLOOD AND LUNG TRANSCRIPTOME OF MICE WITH BRON-CHOPULMONARY DYSPLASIA
C. Revhaug; M. Zasada; A.G. Gro Rognlien; L.O. Baumbusch; A. Madetko-Talowska; P. Kwinta; M. Bik-Multanowski; J.J. Pietrzyk; O.D. Saugstad *(Oslo, Norway; Krakow, Poland)*

16.15 – 16.45 Coffee Break

Chairpersons: Rangasamy Ramanathan *(Los Angeles, USA)*, Christian P. Speer *(Würzburg, Germany)*

Invited Lecture

16.45 – 17.15 OXYGEN TARGETING FOR PRETERM INFANTS AFTER NEOPROM
Ben Stenson *(Edinburgh, United Kingdom)*

17.15 – 17.25 Discussion

Oral Presentations

17.25 – 17.40 COMPARISON OF ALVEOFACT AND SURFACTANT IN LUNG LAVAGED ADULT RABBITS AND IN A PRETERM LAMB MODEL OF RESPIRATORY DISTRESS SYNDROME
B. W. Kramer; F. Ricci; E. Kuypers; D. Ophelders; M. Nikiforou; M. Willems; M. Hütten; F. Bianco *(Maastricht, The Netherlands; Parma, Italy)*

17.40 – 17.55 EFFECT OF PHOSPHOLIPID COMPOSITION IN SYNTHETIC SURFACTANTS
A. Calkovska; B. Linderholm; M. Haegerstrand-Björkman; B.Pioselli; N.Pelizzi; J. Johansson; T. Curstedt *(Stockholm, Sweden; Parma, Italy)*

17.55 – 18.10 ADSORPTION TEST TO PREDICT NEED FOR SURFACTANT ADMINISTRATION IN PRETERM NEONATES UNDER CPAP
D. De Luca; C. Autilio; M. Echaide; A. Wittver; S. Shankar-Aguilera; J. Perez-Gil *(Madrid, Spain; Paris, France)*

Saturday, June 4th 2016

Chairpersons: Mats Blennow*(Stockholm,Sweden)*, Richard Plavka *(Prague, Czech Republic)*

Invited Lecture

08.30 – 09.00 SYNCHRONIZED NASAL INTERMITTENT POSITIVE PRESSURE VENTILATION OF THE NEWBORN: TECHNICAL ISSUES AND CLINICAL RESULTS
Corrado Moretti *(Rome, Italy)*

09.00 – 09.10 Discussion

Oral Presentations

09.10 – 09.25 PRODUCTION OF RECOMBINANT VERSIONS OF LUNG SURFACTANT PROTEINS
J. Johansson; N. Kronqvist, O. Basabe Burgos, M. Sarr, L. Sjöberg, J. Zebialowizc, K.Nordling, A. Rising *(Stockholm, Sweden)*

09.25 – 09.40 THE EFFECTS OF EARLY NASAL CPAP AND SURFACTANT ON A LEVEL OF CLARA CELLS IN PRETERMS WITH RDS
S. Asadova *(Baku, Azerbaijan)*

09.40 – 09.55 MODERATE ANTI-INFLAMMATORY EFFECT OF N-ACETYLCYSTEINE AMIDE NACA) AFTER EXPOSURE TO NEONATAL HYPOXIA IN A PIGLET MODEL©
T. Benterud; L. Pankratov; G. Florholmen; S. Nordgren; L.O. Baumbusch; R. Solberg; O.D. Saugstad *(Oslo, Norway; Stockholm, Sweden)*

Invited Lecture

09.55 – 10.25 SUSTAINED INFLATION AND ITS ROLE IN THE DELIVERY ROOM MANAGEMENT OF THE PRETERM INFANTS
Gianluca Lista *(Milan; Italy)*

10.25 – 10.35 Discussion

10.35 – 11.00 Coffee Break

Chairpersons: Ola D. Saugstad *(Oslo, Norway)*, Jatinder Jit Singh Bhatia *(Augusta, USA)*

Invited Lecture

11.00 – 11.30 ROP: THERAPEUTIC STRATEGIES BASED ON PATHOPHYSIOLOGY
Rangasamy Ramanathan *(Los Angeles; USA)*

11.30 – 11.40 Discussion

Oral Presentations

11.40 – 11.55 ANALYSIS OF NOTCH PATHWAY COMPONENTS IN LUNG INNATE IMMUNITY CELLS IN PRETERM INFANTS
N. Bhopal; B. Chan; A. Fischer; D. Mathur; R.Ramanathan; P. Minoo
(Los Angeles, USA; Salt Lake City, USA)

11.55 – 12.10 TENASCIN C KNOCKOUT MICE: PULMONARY FUNCTION IN NEWBORN AND ADULT ANIMALS
M. Roth-Kleiner; S Gremlich; T Cremona; J Schittny
(Lausanne, Switzerland; Bern, Switzerland)

Invited Lecture

12.10 – 12.40 STEM CELLS FOR NEONATAL BRAIN DISORDERS
Won Soon Park *(Seoul; South Korea)*

12.40 – 12.50 Discussion

12.50 – 14.30 Lunch and Poster Viewing

13.30 – 14.30 ***Poster Presentations 2***

Chairpersons: Kris Sekar *(Okhlaoma City, USA)*, Daniele De Luca *(Paris, France)*

Poster 13 SURFACTANT MAINTAINS SPREADING OF ADMIXED ANTIBIOTICS
E. Herting, G. Stichtenoth, G. Diekmann, G. Walter *(Lübeck, Germany)*

Poster 14 SOLUBLE CD14 SUBTYPE (SCD14-ST) PRESEPSIN LEVELS IN PRETERM NEWBORNS WITH RDS
N. Kultursay; S.Ergör; O. Altun Koroglu; M. Yalaz; M. Akisu *(Izmir, Turkey)*

Poster 15 TARGETED NEXT-GENERATION SEQUENCING FOR GENETIC DIAGNOSIS OF NEONATAL/INFANTILE PULMONARY HYPERTENSION
O. Danhaive; D. Peca; J. Hawkins; M. Hengst; A. VanHeist; A. Zovein; M. Griese; P. Ursell *(San Francisco, USA; Rome, Italy; Munich, Germany; Nijmegen, The Netherlands)*

Poster 16 EFFECT OF EXTERNAL INSPIRATORY LOADING ON DIAPHRAGMATIC FUNCTION OF PRETERM INFANTS WITH AND WITHOUT CHRONIC LUNG DISEASE
G. Dimitriou; A. Vervenioti; S. Fouzas *(Patras, Greece)*

Poster 17 IS SERUM PROCALCITONIN LEVEL A RELIABLE INDICATOR IN EARLY DIAGNOSIS AND TREATMENT OF CONGENITAL PNEUMONIA?
S. Yigit, D. Bozkaya, E. Bagis, M. Yurdakok *(Ankara, Turkey)*

Poster 18 OUTCOMES AMONG PREMATURE INFANTS WITH RESPIRATORY DISTRESS SYNDROME (RDS) TREATED WITH SURFACTANTS: A RETROSPECTIVE STUDY
K. Sekar; M. Krukas; D. Fuentes; W. Mountford; F. Ernst *(Oklahoma City, USA; Quintiles; Chiesi USA, Indegene)*

Poster 19 HEART RATE VARIABILITY ANALYSIS FOR PAIN ASSESSMENT IN PRETERM INFANTS TREATED WITH DIFFERENT SURFACTANT ADMINISTRATION TECHNIQUES
N. Okur; M. Buyuktiryaki; E. Yarci; N. Uras; M.Y. Oncel; F.N. Sari; E.A. Dizdar; S.S. Oguz *(Ankara, Turkey)*

Poster 20 THE EFFECT OF CAFFEINE ON EXPERIMENTAL BILIRUBIN TOXICITY IN NEWBORN RAT ASTROCYTES
M. Deliktas; H. Ergin; S Akgun; H. Akca; O.M.A. Ozdemir; B. Ozdemir *(Denizli, Turkey)*

Poster 21 A CONTINUOUS QUALITY IMPROVEMENT INITIATIVE TO REDUCE NOSOCOMIAL INFECTION RATES
A. Walker; J. Courtney; U. Robinson; S. Craig; C. Mayes *(Belfast,UK)*

Poster 22 ROUTINE ANTITHROMBIN III REPLACEMENT DURING NEONATAL EXTRACORPOREAL MEMBRANE OXYGENATION
J. Bhatia; B. K. Stansfield; L. Wise; P. Ben Ham; P. Patel;, M. Parman; S. Mathur; G. Harshfield *(Augusta, Georgia)*

Poster 23 BEDSIDE BLOOD GAS VS LABORATORY ANALYSIS OF SODIUM: IS THERE A DIFFERENCE?
R. Ramanathan; T. Glasberg; T. Chavez; A. Garingo *(Los Angeles, USA)*

Poster 24 COMPARING PRACTICE IN NORTHERN IRELAND WITH GUIDANCE ON ANTIBIOTIC MANAGEMENT OF EARLY ONSET NEONATAL SEPSIS: NICE?
C. Anderson; C. Mayes; M. Hogan *(Belfast, UK; Craigavon, UK)*

SPiN - UPDATES

Chairpersons: Carlo Dani *(Florence, Italy)*, Boris Kramer *(Maastricht, The Netherlands)*

14.30 – 15.00	CONTROVERSIES IN PRETERM BRAIN INJURY Pierre Gressens *(Paris, France)*
15.00 – 15.30	FETAL GROWTH RESTRICTION ON BRAIN STRUCTURE AND NEURODEVELOPMENTAL OUTCOME Petra Huppi *(Geneva, Switzerland)*
15.30 – 15.45	Discussion
15.45 – 16.00	Coffee Break

Chairpersons: Dominique Haumont *(Bruxelles, Belgium)*, Eren Ozek *(Istanbul, Turkey)*

16.00 – 16.30	ADVERSE DRUG REACTIONS IN NEONATES Karel Allegaert *(Leuven, Belgium)*
16.30 – 17.00	IS ULTRASOUND USEFUL IN DIAGNOSTICS OF NEWBORN LUNG DISEASE? Francesco Raimondi *(Napoli, Italy)*
17.00 – 17.15	Discussion
17.15	CLOSING REMARKS and INVITATION TO DUBLIN Giuseppe Buonocore *(Siena, Italy)*

SPiN 2016

Sharing Progress in Neonatology

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Poster List

POSTER 1

FROM MOUSE DEVELOPMENT TO SHEEP LUNG INJURY

Navin Bhopal 1; Changgong Li2; Mar Janna Dahl3; Kurt Albertine3; Deepti Mathur1; Rangasamy Ramanathan1; Parviz Minoo
1 Division of Neonatology, LAC+USC Medical Center & Children's Hospital Los Angeles
2 University of Southern California, Los Angeles, 3 Division of Neonatology, University of Utah, Salt Lake City, United States

BACKGROUND

The molecular basis of BPD remains elusive. Mice & sheep models are useful for studying human BPD. Here, we examined expression of novel genes identified in a mouse model of lung development in lambs exposed to invasive or non-invasive ventilation.

PATIENT AND METHODS

Genes were identified by microarray of mouse lung tissue RNA during development. The genes Cyr61, Slitrk6 & Pdgfra were selected for analysis in sheep lung based on function. Expression was examined in lungs of sheep delivered at 128 to 150 days (term) gestation. We also analyzed lungs of sheep born at 132 days exposed to invasive mechanical ventilation (MV) or non-invasive high frequency nasal ventilation (HFNV) for 3 or 21 days. RNA was isolated & gene expression assessed by qPCR.

RESULTS

In uninjured sheep lungs Slitrk6 & Cyr61 increased at term. Pdgfra trended towards decreased expression at term. In injured lambs Cyr61 increased in both MV and HFNV groups on day 3. Expression in HFNV was greater than MV. Slitrk6 decreased in both MV & HFNV groups on days 3 & 21. Pdgfra expression was higher in HFNV than MV lambs on day 3.

CONCLUSIONS

We found progressive rise in Cyr61 & Slitrk6 mRNA during sheep lung development. This suggests they are needed for pulmonary adaptation at birth. Cyr61 & Pdgfra expression is more robust in HFNV than MV sheep on day 3 suggesting an association with better outcome. Slitrk6 decreased in injured lungs. While these results are preliminary, they suggest adaptive changes in expression of developmentally critical genes in the lung in response to preterm birth.

Supported By: NHLBI and the Hastings Foundation

POSTER 2

BROAD SPECTRUM GENETIC DIAGNOSIS FOR PULMONARY CILIARY DYSKINESIA BY TARGETED NEXT GENERATION SEQUENCING

O. Danhaive, D. Peca, N. Ullmann, A. Angioni, R. Boldrini, R. Cutrera
OD: neonatology division, University of California San Francisco Benioff Children's Hospital, San Francisco, CA, USA and neonatology department, Bambino Gesù Children's Hospital, Rome, Italy
DP, NU, AA, RB, RC: divisions of reserch laboratories, pulmonology, medical genetics, pathology and pulmonology, Bambino Gesù Children's Hospital, Rome, Italy

BACKGROUND

Primary ciliary dyskinesia (PCD) is a heterogeneous disease characterized by chronic respiratory symptoms including wheezing, cough, hypoxemia, recurrent upper and lower respiratory tract infections and bronchiectasis, occasionally associated with congenital anomalies in other organ systems, with an onset varying from the neonatal period to childhood. To date, mutations in 30 different genes have been identified, which makes conventional genetic sequencing complex, lengthy and expensive.
AIMS: 1. To test an innovative genetic diagnostic approach through targeted next-generation sequencing (NGS); 2. To determine the most prevalent gene(s) affected in an italian cohort of patients with suspected PCD.

PATIENT AND METHODS

The patients were selected in the Bambino Gesù Children's Hospital pulmonology service during the 2014-2015 based on clinical history of chronic respiratory symptoms, recurrent respiratory tract infections, exhaled nitric oxide test plus nasal brushing high speed video microscopy analysis (HVMA) and electron microscopy (EM) in a subset. A custom-made panel of 26 PCD-related genes (see table) was used on an Illumina MiSeq® high-throughput sequencing platform. Coding and non-coding areas of the selected genes were covered 83% on average. Variants identified were confirmed by conventional Sanger sequencing.

RESULTS

29 children aged 1 month - 12 years were enrolled. We identified bi-allelic mutations in 8 children in the following genes: DNAH11 (4 cases), DNAH5 (2 cases), CCDC40 and RSPH4A (1 case each), plus a mono-allelic mutation in CCDC39 in one child, for a total yield of 31%, median diagnosis age 13 years (range 4-33) (see table).

case	age (y)	gene	mutation 1	exon	Polyphen	mutation 2	exon	Polyphen
1	10	DNAH11	S3860P	61	damaging	W2804X	51	damaging
2	13	DNAH11	c.693-1G>A	4	damaging	R1627C	28	damaging
3	17	DNAH11	N1424S	25	damaging	L3084fs2	56	damaging
4	9	DNAH11	Y190X	3	damaging	Y190X	3	damaging
5	5	DNAH5	P1481S	28	damaging	G106fs 4	4	damaging
6	24	DNAH5	R2639fs 9	48	damaging	R2639fs 9	48	damaging
7	33	CCDC40	R814X	7	damaging	S252fs 43	3	damaging
8	14	RSPH4A	G464E	4	damaging	G464E	4	damaging
9	4	CCDC39	L183fs3	2	damaging			

Gene panel: DNAI1, DNAI2, DNAH5, DNAH11, RSPH9, RSPH4A, TXNDC3, CCDC103, LRRC6, C19orf51, LRRC50, C14orf104, CCDC39, CCDC40, HEATR2, HYDIN, RSPH1, SPAG1, CCDC114, CCDC65, ZMYND10, CSF2, THBS1, DNAL1.

CONCLUSIONS

DNAH11 mutations were the most frequent cause of PCD in our Italian cohort. Published DNAH11 are rarer, accounting for 20% of PCD with normal ultrastructure. This targeted NGS panel offers a fast, reliable approach to genetic diagnosis in PCD, that may offset the need for EM and HVMA. This study may help focusing on population-specific most frequent genes for future clinical applications..

POSTER 3

NASAL INTERMITTENT POSITIVE PRESSURE VENTILATION VERSUS BI-LEVEL CPAP FOLLOWING EXTUBATION IN INFANTS ≤ 1250 G BIRTHWEIGHT

N. Okur, M. Buyuktiryaki, F.N. Sari, E. Alyamac Dizdar, N. Uras, F.E. Canpolat, S.S. Oguz
Zekai Tahir Burak Maternity Teaching Hospital, Neonatal Intensive Care Unit, Ankara, Turkey

BACKGROUND

We aimed to compare the effectiveness of nasal intermittent positive pressure ventilation (NIPPV) versus bi-level nasal CPAP (BiPAP)following extubation in preterm infants ≤1250 g birthweight.

PATIENT AND METHODS

In this prospective randomized study,mechanically ventilated preterm infants with birthweight ≤1250 g were screened for eligibility following parental consent. Enrolled infants were randomized into two study groups (NIPPV and BiPAP)following the decision to extubate. Non-invasive respiratory support was delivered using the device of SLE 5000 (Specialised Laboratory Equipment, South Croydon, United Kingdom) in NIPPV group and infant flow-driver device(Viasys Corp, Care Fusion, CA) in BiPAP group. Surfactant requirement was evaluated in infants after admission. Poractant alfa was administered if necessary. The primary outcome, rate of extubation failure within 96 hours following first extubation, was compared between the groups. Short and long-term neonatal outcomes were also evaluated.

RESULTS

A total of 113 infants enrolled in the study. There was no significant difference between groups in terms of demographic characteristics. Rate of extubation failure within 96 hours following first extubation was significantly lower in BiPAP group compared to NIPPV group (30.4% vs 50.9%, p= 0.02).Statistically significant difference in median duration of mechanical ventilation was observed between BiPAP and NIPPV groups (5 vs 8 days, p=0.04). Duration of non-invasive respiratory support did not differ between two groups (p>0.05). Severe intraventricular hemorrhage (IVH) and retinopathy of prematurity (ROP) were significantly lower in BiPAP group compared to NIPPV group (p=0.04 p=0.006).

CONCLUSION

BiPAP administration following extubation might have a better effect than NIPPV on the rate of extubation failure in preterm infants ≤1250g. Short-term neonatal outcomes were similar between groups except for severe IVH and ROP which were higher in the NIPPV group.

POSTER 4

SURFACTANT AND ASSISTED VENTILATION REDUCED THE MORTALITY OF NEONATES WITH HYPOXEMIC RESPIRATORY FAILURE AND A BIRTH WEIGHT >1500 G

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2 Hunan Provincial Children's Hospital, Changsha;
3 Hebei Provincial Children's Hospital, Shijiazhuang;
4 First Hospital Of Jilin University, Changchun;
5 Xiamen Maternity Hospital, Xiamen

BACKGROUND

We retrospectively analyzed clinical record of 5,650 neonates with birth weight (BW) >1500 g across all gestational age (GA) diagnosed with hypoxemic respiratory failure (NRF) from a network of 55 NICU in China, with the aim of evaluating the efficacy of surfactant therapy and assisted ventilation.

PATIENT AND METHODS

NRF was defined as acute hypoxemia requiring MV and/or nCPAP for at least 24 hours. Patients were allocated as moderate preterm (MPT, 1,735, 30.7%), late preterm (LPT, 1,431, 25.4%), term (TM, 2,376, 42.1%) and post term (PT, 79, 1.4%), with GA<33, 34-36, 37-41 and >42 weeks, respectively. The underlying diseases, type of ventilation, surfactant therapy, outcome and care burden were analyzed using clinical data files.

RESULTS

In the four groups, there were 66.9%, 42%, 16.5% and 5.1% diagnosed as RDS, and 13.8%, 25.4%, 46.5% and 76.0% pneumonia/sepsis and MAS, respectively. Surfactant was given to 21.9% (1,238) of NRF and 51.2% (n =1108) of RDS. Survival rates of RDS (both surfactant and non-surfactant treated) in the 4 groups were 82.2%, 87.8%, 81.2% and 75.0%, respectively (P <.01, numbers needed to treat 7-12 for surfactant). Overall mortality rate of NRF was 21%, and of MAS and pneumonia/sepsis, 29.4% and 27.6%, respectively. In the four groups, the mortality rate was 17.9%, 14.7%, 26.3% and 39.2%, respectively. Most of the deaths occurred on parental withdrawals. Uni- and multivariate logistic regression analysis showed that relative risk of death was associated with higher SNAPPE II score, female, MV and congenital anomalies.

CONCLUSION

The outcome of NRF in neonates with BW >1,500 g is a significant indicator reflecting standard of respiratory care in Chinese NICU network. Both MPT and LPT had similar risks of death, and surfactant remained effective in the treatment of NRF.

POSTER 5

LESS INVASIVE SURFACTANT ADMINISTRATION IN THE NORDICS - A SURVEY

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BACKGROUND

Less invasive surfactant administration (LISA), i.e. surfactant therapy during spontaneous breathing without conventional tracheal intubation, is increasingly used in preterm infants. We report the present use of this technique in the Nordic countries.

PATIENT AND METHODS

A web-based survey of surfactant administration was emailed to directors of all neonatal units in the Nordic Region (in Finland only to the 5 university-based departments).
Respondents were instructed that answers should reflect practice of the unit and not personal preferences.

RESULTS

73 units (83 %) responded, and 23 (32 %) reported using LISA: Denmark (including Faroe Island and Greenland) 11%, Finland 60%, Iceland 100%, Norway 82%, and Sweden 9 %. LISA was used in 62% of level 3 units, but only in 14% of level 2 units, and most commonly in babies with GA ≥26 weeks. Premedication was used, always or sometimes, by 78% of responding units. The main reasons for not using LISA were "unfamiliar with technique" (61%), "no benefit over other methods" (22%), and "concerns about discomfort" (26%).

CONCLUSION

LISA was used in 32% of Nordic neonatal units, most commonly in Norway, and outside of Norway only in level 3 units. Premedication was used more often than previously reported.

TABLE 1
Number of participating units in relation to countries and level of care

	Level 1	Level 2	Level 3	TOTAL
Denmark	1(33%)	11(92%)	4 (100%)	**16 (84%)**
Faroe Island	n/a	1 (100%)	n/a	**1 (100%)**
Finland	n/a	n/a	5 (100%)	**5 (100%)**
Greenland	n/a	1 (100%)	n/a	**1 (100%)**
Iceland	n/a	0	1 (100%)	**1 (100%)**
Norway	2 (100%)	7 (64%)	8 (100%)	**17 (81%)**
Sweden	2 (50%)	22 (79%)	8 (100%)	**32 (80%)**
TOTAL	**5 (56%)**	**42 (79%)**	**26 (100%)**	**73 (83%)**

n/a (not applicable) means there are no units at the specified level, or they were not invited (Finland).

TABLE 2
Number of units using LISA in relation to number of responses for specific countries and levels of care.

	Level 1	Level 2	Level 3	TOTAL
Denmark	0/1	0/11	2/4 (50%)	**2/16 (13%)**
Faroe Island	n/a	0/1	n/a	**0/1**
Finland	n/a	n/a	3/5 (60%)	**3/5 (60%)**
Greenland	n/a	0/1	n/a	**0/1**
Iceland	n/a	n/a	1/1 (100%)	**1/1 (100%)**
Norway	1/2 (50%)	6/7 (86%)	7/8 (88%)	**14/17 (82%)**
Sweden	0/2	0/22	3/8 (38%)	**3/32 (9%)**
TOTAL	1/**5 (20%)**	**6/42 (14%)**	**16/26 (62%)**	**23/73 (32%)**

n/a (not applicable) means there are no units at the specified level, or they were not invited (Finland).

TABLE 3
Types of drugs used in 18/23 units using premedication for LISA.

Fentanyl	14 (78%)
Atropine or simillar	7 (39%)
Midazolam	5 (28%)
Morphine	3 (17%)
Propofol	2 (11%)
Ketamine	2 (11%)
Other opioid	1 (6%)
Rocuronium	1 (6%)
Succinylcholine	1 (6%)
Thiopental	1 (6%)

1. **Please specify country, and please use the text box to write the name of your hospital**
   n=73 replies
   Denmark *16* Sweden *32* Norway *17* Finland *5* Iceland *1* Greenland *1* Faroe Islands *1*

2. **Using the definitions below modified from the American Academy of Pediatrics, please select the level of care that most appropriately reflect your unit**
   n=73 replies
   Level 1 *5* Level 2 *42* Level 3 *26*

3. **Please indicate the yearly number of infants < 32 weeks admitted and cared for in your department**
   n=73 replies
   Less than 10 *11* From 11-50 *40* From 51-100 *14* More than 100 *8*

4. **Please indicate number of surfactant administrations per year**
   n=73 replies
   Less than 10 *30* From 11-50 *30* From 51-100 *10* More than 100 *3*

5. **Please indicate method(s) of surfactant administration in your department, tick more than 1 box if appropriate**
   replies from 73 departments, more replies from each department
   Always with intubation and subsequent mechanical ventilation *25* Always INSURE *20*
   Sometimes INSURE *40* Always LISA *0* Sometimes LISA *23**
   Surfactant is never administered in my department or only by retrieval teams *1* Comments, other *12*

6. **If LISA has never been used in your department indicate reasons for not using LISA (please tick more boxes as needed)** *valid replies from 46 departments*
   Never heard of it *3* Unfamiliar with technique *28* Worried about patient discomfort during procedure *12*
   No benefit over INSURE *10* Not evidence based *6* Other reason, please specify *5*

7. **With the present evidence available, would your department consider to introduce LISA for surfactant administration in the future?** *valid replies from 47 departments*
   yes *22* no *7* maybe *18*

8. **If LISA is performed in your department, please specify in which of the following gestational ages (GA) this would be considered appropriate as per unit policy (tick more boxes as needed).** Valid replies from 23 depart.
   all gestational ages *1* 22-23 weeks GA *3* 24-25 weeks GA *10* 26-27 weeks GA *18* 28-30 weeks GA *20*
   31-32 weeks GA *16* above 33 weeks GA *10*

9. **If LISA is performed in your department, who performs the procedure (tick more than 1 box if needed)?**
   Consultant Neonatologist *21* Doctor currently undergoing advanced neonatal training ("fellow") *7*
   Paediatrician subspecialised in other field than neonatology *6* Paediatric Anaesthetist *1*
   Anaesthetist *4* Unspecialized doctors working in paediatric/neonatal department *2* Other (please specify) *0*

10. **Please indicate method used to perform LISA (tick more boxes if needed)**
    The "Cologne" method *20* The "Hobart" method *6* Other Method *0*

11. **Please indicate type of premedication/sedation used for LISA (tick more boxes if appropriate)**
    No premedication used *12* Morphine *3* Fentanyl *14* Other Opiate *1* Atropine or similar *7*
    Suxamethonium *1* Rocuronium *1* Propofol *2* Thiopental *1* Midazolam *5*
    Ketamine *2* other drugs, please specify *0*

Footnotes:
Ad Q5: 25 units reported to use LISA, but 2 units also answered Q6 and Q7, and therefore not included when analysing Q5-11
Individual replies "sometimes INSURE" and "always INSURE" were grouped for subsequent analyses, and units selecting more options when selecting "always with intubation..." were removed from that group.
Ad Q10: 3 departments selected both Hobart and Cologne method
Ad Q11: For further analyses the following groups were made: units selecting "no premedication" AND also selected specific drugs were grouped as "sometimes premedication, units only selecting "no premedication" were grouped as "never premedication" and units *not* selecting "no premedication" were grouped as "always premedication"

Figure 1
Survey questions and responses.

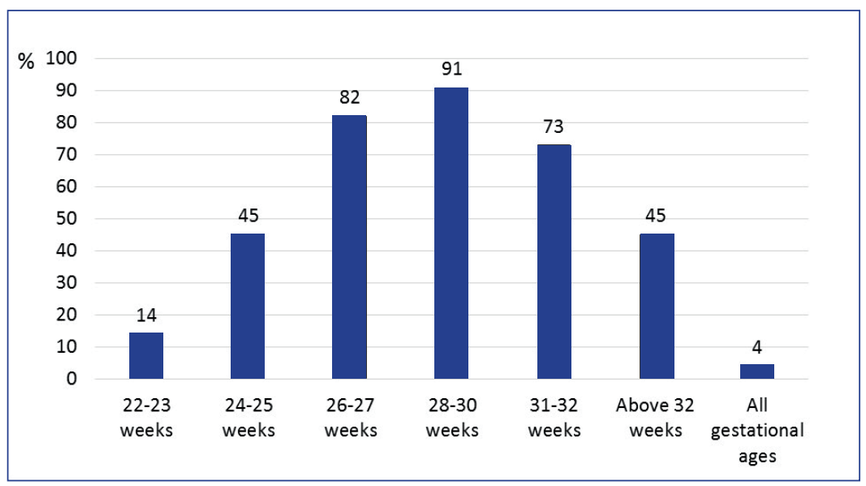

Figure 2
Percent of respondents (n = 23) stating that LISA is appropriate at different gestational ages.

POSTER 6

COMPARISON OF THE EFFECTS OF DIFFERENT INITIAL DOSES OF PORACTANT ON TISSUE OXYGENATION IN EXTREMELY PRETERM INFANTS

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BACKGROUND
Although surfactant improves systemic oxygenation, there is very limited data about its' effects on tissue oxygenation. The aim of this study was to compare the effects of different doses of poractant on cerebral, renal and mesenteric oxygenation in extremely preterm infants with respiratory distress syndrome (RDS).

PATIENT AND METHODS
This study was performed in extremely preterm infants (≤ 28 weeks of gestation and/or ≤1000 g) who were admitted to NICU with RDS and given poractant as early rescue treatment. Infants were randomized into two groups (poractant of 200 mg vs. poractant of 100 mg per kg). Near-infrared spectroscopy was used for determination of tissue oxygenation. It was recorded for the first 24 hours of life.

RESULTS
There were 24 infants in 100 mg poractant group and 27 infants in 200 mg group with a median gestational age of 25 weeks and 780 g birth weight. Two groups were similar in terms of demographic features. The oxygenation of the cerebral, renal and mesenteric tissues showed an increase just after surfactant administration. From the 4th hour of syrfactant administration, the oxygenation of the cerebral ,renal and mesenteric tissues started to decline. However, no significant differences were observed between two groups in terms of cerebral, renal and mesenteric tissue oxygenation at all time points until 24 hours of surfactant administration (p>0.05).

CONCLUSION
Both doses of poractant improved cerebral, renal and mesenteric tissue oxygenation just after administration. However, there were no significant differences between two groups in terms of tissue oxygenation at 1, 4, 6 and 24 hours of surfactant therapy. In addition to improvement of systemic oxygenation, tissue oxygenation were improved after surfactant administration in extremely preterm infants.

POSTER 7

THE INFLUENCE OF INSPIRATORY TIME ON THE EFFICIENCY OF NON-INVASIVE VENTILATION IN PRETERM INFANTS

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BACKGROUND
It still remains unclear whether non-invasive ventilation is more effective than nasal CPAP in premature infants. Short inspiratory time can lead to ineffectiveness of non-invasive ventilation when device with open exhalation circuit such as Infant Flow SiPAP is used in Biphasic mode. Optimal inspiratory time could compensate circuit leakage and improve the efficiency of non-invasive ventilation.

PATIENT AND METHODS
Three modes of non-invasive respiratory support of Infant Flow SiPAP were evaluated in prospective comparative trial.148premature babies born at 25-35 weeks were included. After initial stabilization in delivery room they were randomized immediately after admission to our NICU and devided into three groups. 48 newborns formed group 1 where BiPhasic mode with insp.time 1sec and frequency 30 was used. 43 newborns formed group 2 BiPhasic mode with insp time 0,5 second and frequency 60 per minute. Group 3 included 57 premature babies on CPAP mode. Mean airway pressure was similar on BiPhasic groups 1 and 2. Incidents of non-invasive support failure was evaluated. The failure criteria were the increase of FiO2>0,4 (FiO2> 0,3 for babies <1000g) and/or increasing of severe respiratory distress, hard work of breathing equivalent to more than 3 points by Silverman scale. In case of start respiratory support failure babies were switched to higher level of respiratory support.

RESULTS
In Group 1, where the respiratory therapy was provided by BiPhasic mode with Tin of 1 second, the criteria of failure were met significantly two times less than in Group 2 and Group 3: 25% vs 58% vs 53% p = 0,0006. Respiratory support failures in group 2 and 3 were similar.

CONCLUSION
Infant Flow SiPAP on BiPhasic mode has advantage over CPAP when insp time is about 1 second to compensate the leakage and create an optimal peak inspiratory pressure. BiPhasic mode with inspiratory time 0.5 sec or less has the same efficiency as CPAP mode and has no advantages over CPAP.

TABLE 1 - Initial respiratory support in Groups

Methods/ Parameters	Group 1 BiPhasic n=48	Group 2 BiPhasic n=43	Group 3 n CPAP n=57
Inspiratory time, sec	1	0,5	
Frequency	30	60	
PiP, sm H2O	8-10	8-10	
Peep, sm H2O	5-6	5-6	5-6
Mean Airway Pressure, smH2O	6,5-8	6,5-8	5-6

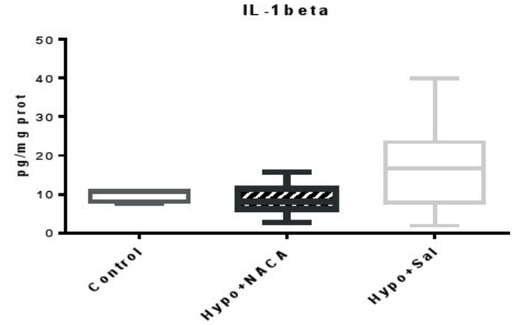
TABLE 2 - Characteristics of groups

Methods/ Parameters	Group 1 BiPhasic n=48	Group 2 BiPhasic n=43	Group 3 CPAP n=57	p value
Birth weight, g Median (min-max)	1785 (495-2685)	1777 (870-2854)	1710 (640-2892)	< 0,5
GA,week Median (min-max)	32 (25-35)	33 (26-35)	32 (25-35)	< 0,5
Apgar 1 min. Median (min-max)	6 (3-8)	7 (5-8)	7 (4-8)	< 0,5
Apgar 5 min Median (min-max)	7 (6-9)	7 (7-8)	8 (6-9)	< 0,5
Babies with VLBW,%	31	28	29	<0,5
Boys/girls	31/17	26/17	29/28	<0,5
antenatal prophylaxis of RDS	62%	64%	61%	< 0,5
surfactant in the delivery room	11%	11%	12%	<0,5

TABLE 3 - Incidents of initial respiratory support failure

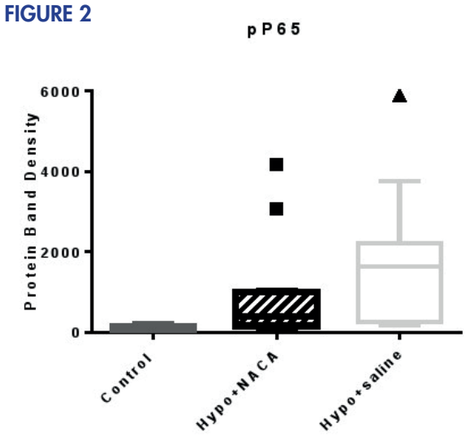
	Group 1 BiPhasic n=48	Group 2 BiPhasic n=43	Group 3 CPAP n=57	P (x2)
The number of patients, who met the criteria of respiratory support failure, (%): FiO2 > (0,3) 0,4 and/or Siverman score >3	12 (25,0%)*	25 (58,1%)	30 (52,6%)	p=0,0006

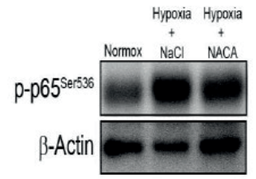
FIGURE 1



The figure illustrates the protein concentration of IL-1b measured in prefrontal cortex

FIGURE 2





The figure shows the protein band density of pP65, measured in prefrontal cortex

POSTER 8

THE EFFECTIVENESS OF INHALED SALBUTAMOL IN TRANSIENT TACHYPNEA OF THE NEWBORN

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BACKGROUND
To evaluate the efficacy of two different (0.15 mg/kg and 0.5 mg/kg) inhaler salbutamol doseage in reducing the duration of respiratory distress in transient tachypnea of the newborn (TTN).

PATIENT AND METHODS
in this randomized-prospective study, 60 infants with a gestational age >37 weeks and birth weight >2500 g with TTN were randomized to either 0.15 mg/kg (group 1; n = 21) or 0.5 mg/kg (group 2; n = 20) and control (group 3; n=19). The primary end point was the reduction of the duration of respiratory distress. Secondary end points were the duration and level of oxygen supplementation, stay on the hospital and duration of respiratory support.

RESULTS
There was significant difference in the duration of respiratory support (22,9 (4-108) h and 17,2 (4-110) h versus 34,1 (4-92) h, p < 0.05), Fi02 flow (26,8±5.6 and 30,7±9.9 versus 32,3±5.4, p < 0.05), stay on hospital (3,0 (1-7) d and 2,6 (1-7) versus 3,8(1.5-8) d, p < 0.05) between the groups. The rate of complications were not significantly different between the groups.

CONCLUSION
Our study indicates that 0.5 mg/kg dose salbutamol inhalation is well tolerated and can be an effective treatment in TTN.

TABLE 1 - Demographic characteristics of study and controls

Parameters		Study group 1 (n=21)	Study group 2 (n=20)	Control group (n=19)	P Value*
Gestational week (weeks)		38.05±1.3	38.05±1.3	37.1±1.5	0.285
Gender (boy/girl)		16 /5	11/9	17/2	0.896
Weight (gram)		2966±434	2932±353	2676±592	0.181
	Mother's anamnesis				
Preeclampsia, n (%)		1 (4.8)	2 (10)	1 (5.3)	0.599
Chorioamnionitis, n (%)		0	0	2 (10.5)	1.000
EMR (> 18 hours), n (%)		0	0	2 (10.5)	0.710

***P<0.05**

TABLE 2 - The comparison pre-treatment and after treatment parameters of the study and controls

	Group 1 (n:21)	Group 2 (n:20)	Group 3 (n:19)
FIO_2(%) pre-treatment	37,8±8	38,7±11.1	36,6±6.2
FIO_2(%) after treatment 30. min	34,8±6	37,4±11.1	35,4±5.4
FIO_2(%) after treatment 1. h	32,6±6.2	35±10.9	34,2±4.9
FIO_2(%) after treatment 4-6. h	26,8±5.6	30,7±9.9	32,3±5.4**
TTN clinical score pre-treatment (n)	5,9±2.5	5,4±1.9	5,3±1.6
TTN clinical score (n) after treatment 30. min	3,8±1.9	4,4±2.0.6	4,8±1.7
TTN clinical score (n) after treatment 1. h	2,7±1.6	3,3±1.9	3,7±1.7
TTN clinical score (n) after treatment 4-6. h	1,5±1.7	1,5±1.6*	3,2±2*
Respiratory rate (/min) pre-treatment	65,1±4.4	64,1±2.7	65, ±3.5
Respiratory rate (/min) after treatment	54,2±5	51,6±6.5 **	60,2±6.8*
Respiratory support, h	22,9 (4-108)	17,2 (4-110)*	34,1 (4-92)
Hospitalization, d	3,0 (1-7)	2,6 (1-7)*	3,8(1.5-8)**
pH pre-treatment	7.32±08	7,27±05	7,29±06
pH after treatment	7,37±05	7,38±0.5	7,35±0
pCO_2 (mmHg) pre-treatment	45,7±13.9	46,8±10.7	44,7±10.6
pCO_2 (mmHg) after treatment	41,8±10	37,8±10.3	41,2±10
pO_2 (mmHg) pre-treatment	59,9±18	62,4±25.5*	45,6±12.6*
pO_2 (mmHg) after treatment	66,8±26.7	67,6±26.1	53,8±24.1
HCO_3- (mEq/L) pre-treatment	20,6±3.6 [a]	19,2±2.4	20,2±2.5
HCO_3- (mEq/L) after treatment	20±2.9	20.8±3.7	21.2±2.6

***p<0.05, **:p<0.01**

POSTER 9

LESS INVASIVE SURFACTANT ADMINISTRATION IN VERY LOW BIRTH WEIGHT INFANTS: NIPPV OR NCPAP?

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BACKGROUND

To compare the effects of unsynchronized intermittent positive pressure ventilation (NIPPV) and nasal continuous positive airway pressure (NCPAP) on the short term prognosis in preterm infants with respiratory distress syndrome.

PATIENT AND METHODS

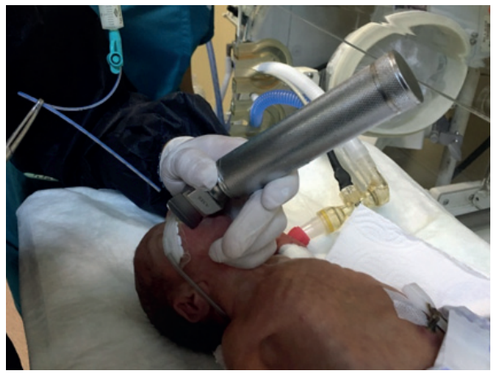
This prospective study was conducted at the Neonatology Clinic of Tepecik Training and Research Hospital between January 2014 and December 2014. A total of 40 infants who were <32 weeks gestation and/or ≤1500 g birth weight and received early surfactant treatment within two hours after birth were included. Infants were randomized either NIPPV group or NCPAP group using sealed envelope randomization. Apnea and neonatal outcomes were recorded in each group. A 6-F sterile nasogastric tube was used for the procedure. The catheter was prepared by shortening at 33-cm depth from the catheter hub. All enrolled infants received 100mg/kg poractant alfa via thin catheter. Infants received NIPPV by a Babylog 8000 plus ventilator in the IPPV mode with appropriate size binasal canul. The ventilator parameters were adjusted at PIP: 2 cmH2O above the normal PIP, PEEP: 6 cmH2O , rate: 40 inflations, FiO2: 0.4. Infants received NCPAP by the same ventilator in the CPAP mode with the same binasal canul.The ventilator parameters were adjusted at PEEP: 6 cmH2O and FiO2: 0.4.

RESULTS

18 infants were randomized to NIPPV group and 22 infants to NCPAP group. No significant differences were observed between the two groups in terms of gestational age, gender, delivery mode and antenatal corticosteroid treatment. However, birth weight is statistically low in the NIPPV group as compared to NCPAP group (p< 0.05).The presence of apnea were higher in CPAP group but statistically not significant. No differences were observed in the prevalence of short term neonatal outcomes.

CONCLUSION

Surfactant administration using LISA, with no sedation, is feasible in preterm infants with RDS. NIPPV may be more effective to prevent apnea.



Preterm, NCPAP, NIPPV

TABLE 1 - Characteristics of infants in NIPPV and NCPAP Groups

Özellik	NIPPV (n=18)	NCPAP (n=22)	p
Gestational age (weeks)*	28.2 ± 2.7	28.8 ± 1.4	0.24
Gender (Male/Female)	10/8	14/8	0.60
Birth weight (g)*	1022 ± 238	1236 ± 229	0.01
Delivery mode (Vaginal/Cesarean)	4/14	1/21	0.09
Antenatal steroids n(%)	11 (63.2)	14 (61.9)	0.87
Respiratory support (day)*	7.2 ± 3.8	7.2 ± 5.2	0.53
O2 dependency (day)*	22.6 ± 15.5	16.7 ± 8.8	0.17

Data are presented as mean ± SD

TABLE 2 - Neonatal outcomes in the study

Özellik	nIPPV (n=18)	nCPAP (n=22)	p
Severe RDS	9	7	0.24
BPD	3	3	0.78
PDA	3	5	0.63
ROP	1	0	0.31
Severe IVK	4	4	0.75
Sepsis	10	7	0.13
PVL	4	2	0.53
Apnea	4	8	0.33
intubation	3	2	0.47
Mortality	0	0	-

Data are presented as mean ± SD

POSTER 10

WELL-DIFFERENTIATED PRIMARY NASAL EPITHELIAL CELL (WD-PNEC) CULTURES DERIVED FROM NEWBORN TERM AND PRETERM INFANTS: AN EXCITING OPPORTUNITY TO STUDY AIRWAY INNATE IMMUNE RESPONSES IN AT RISK GROUPS

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BACKGROUND

Airway epithelial cell innate immune responses represent important first lines of defense against airway pathogens and allergens. Respiratory syncytial virus (RSV) is the commonest cause of severe lower respiratory tract infection in infants under two-years worldwide with young and premature infants at greater risk of severe RSV-related disease. However, little is known about the newborn airway epithelium and whether differences exist between innate airway epithelial responses to pathogens in preterm versus term newborns.

PATIENT AND METHODS

This study aimed to establish and characterise a model of the neonatal airway epithelium by production of well differentiated primary nasal epithelial cell cultures (WD-PNECs) from newborn cells. Interdental brushes were used to obtain nasal epithelial cells from term and preterm infants shortly after birth. Morphologically authentic WD-PNECs were generated from the cells and characterised morphologically using light microscopy and immunocytochemistry. Responses of the WD-PNECs to respiratory syncytial virus (RSV) infection were determined.

RESULTS

Newborn WD-PNEC cultures were successfully established in 67% of term and 78% preterm samples. Cultures had extensive cilia coverage and mucous production. RSV cytopathogenesis, growth kinetics and chemokine responses were determined by mock-infecting or infecting these WD-PNECs.

CONCLUSION

To our knowledge this is the first time WD-PNECs have been produced from newborn term and preterm cells. These WD-PNECs represent a unique opportunity to study differential airway epithelium innate immune responses in neonates.

POSTER 11

LESS INVASIVE SURFACTANT APPLICATION VS CONVENTIONAL THERAPY IN EXTREMELY PRETERM INFANTS

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BACKGROUND

Less invasive surfactant administration (LISA) has been combined with CPAP to avoid intubation and lung injury. Outcome measures were bronchopulmonray dysplasia (BPD) or death at 36 weeks of gestation (GA), duration of mechanical ventilation (MV), and other major neonatal morbidities.

PATIENT AND METHODS

A retrospective, single center, case-control study. Infants, received LISA and born < 29 wks of GA in 2014, were matched by GA, gender, birth weight, SGA, and highest supplemental oxygen during the first 12 h to the control group infants born in 2012-13. Chi-square and T test were used for statistical analysis.

RESULTS

21 infants were treated with LISA method in 2014. LISA infants were less frequently intubated on day three (5 (24%) vs 21 (55%); p= 0.013) and required fewer days of MV (6.2 vs 22.1, p = 0.017), however did not have lower rates of MV (12 (57%) vs 25 (66%), p < 0.58). There was no difference between the goups in the incidence of severe intraventricular hemorrhage (1 (4.8 %) vs 3 (7.9 %); p =1.00), necrotizing enterocolitis (2 (9.5%) vs 2 (5.3%); p = 0.611), and combined outcome of BPD and death (10 (47.6%) vs 22 (58%), p = 0.586). A trend to less postnatal steroid in the LISA group was noticed (8 (38%) vs 17 (45%), p = 0,126).

CONCLUSION

For extremly preterm infants LISA method is associated with shorter time of MV.

POSTER 12

HAEMODYNAMIC EFFECT OF LESS INVASIVE SURFACTANT ADMINISTRATION

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BACKGROUND

High mean airway pressure is known to have a negative effect on venous return and is associated with the development of intraventricular hemorrhage (IVH) in preterm babies. Less invasive surfactant administration (LISA) has the ability to avoid mechanical ventilation. Recent evidence has shown a significant impact on the incidence of IVH in extreme preterm babies. The aim of this study is to compare the effect on cardiac output between classic surfactant administration (CSA) or LISA.

PATIENT AND METHODS

A retrospective cohort study of inborn babies below a gestational age of 28 weeks, born at the University Hospital Antwerp, Belgium. Patients who received surfactant after birth were divided into 2 groups. In the CSA group the babies were intubated and ventilated. In the LISA group patients received surfactant by thin catheter method while spontaneously breathing. As per standard protocol a functional echocardiography was performed close to a postnatal age of 12 hours. Cardiac output, size of the ductus arteriosus and peak velocity of ductal flow were compared between groups using the Mann-Whitney-U or Chi square test. A p -value < 0,05 was considered statistically significant.

RESULTS

One hundred and twelve babies were included in the study. LISA group consisted of 24 patients compared to 51 babies in the CSA group. An echocardiography was performed in 22 (92%) versus 32 (62%) patients in the LISA and CSA group respectively.Gestational age and birth weight were not different between groups, only lactate level on admission was higher in the CSA group.
Right ventricular output was significantly lower in the CSA group (median: 226 vs. 277 ml/kg/min).Peak systolic velocity of ductal flow was significantly higher in the LISA group (median 1.85 vs. 1.55 m/s), suggesting decreased pulmonary vascular resistance.

CONCLUSION

LISA possibly promotes a more physiologic haemodynamic response to surfactant compared to classic surfactant administration.

POSTER 13

SURFACTANT MAINTAINS SPREADING OF ADMIXED ANTIBIOTICS

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BACKGROUND

Delivery of drugs into the lung using surfactant as a transport vector has been a subject of previous in vitro and animal studies. The rapid spreading properties of surfactants may be used for distribution of the drugs throughout the surface of the conducting airways. However, there is scarce information confirming this hyothesis. Furthermore, surfactant and the potentially transported drug may change original properties by mutual interaction.

PATIENT AND METHODS

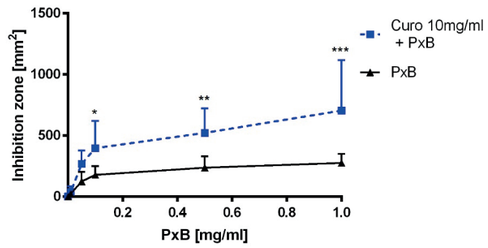
Surfactant (10 mg/ml) was mixed with Rifampicin, Polymyxin B or Polymyxin E in order to reach final concentrations of 0.001, 0.01, 0.05, 0.1, 0.5 and 1 mg/ml. Staph.aureus, a capsuled group B streptococci (LD), a non-capsuled variant (HD) and E.coli were incubated to reach mid logarithmic growth phases and adjusted to bacteria samples at 10^7 colony forming units per 100 or 200 µL using a spectrophotometer. Bacteria samples were swabbed uniformly across agar dishes. 10 µL of the surfactant/antibiotic mixture were transferred to central agar plate. Identical antibiotic concentrations without surfactant were used as controls. Following 24h incubation, the zone of bacterial growth inhibition was determined using an automated colony counter. Each experiment was repeated 3-4 times.

RESULTS

With increasing antibiotic concentrations, larger inhibition zones were found. Surfactant containing samples showed inhibition zones that were ≥ controls. A significantly increased spreading along with surfactant was found for Polymyxin B (Fig.) or E (≥ 0.5 mg/ml) on 200µL but not on 100µL E.coli samples, for Rifampicin on 100µL samples of HD, on 100µL or 200µL samples of Staph.aureus, but not on HD bacteria.

CONCLUSION

In the used experimental setting, presence of surfactant improves spreading of added Rifampicin, Polymyxin B and Polymyxin E. Thus, surfactant may help distributing different antibiotics. Further research is needed to understand details of spreading effects at different surfactant and antibiotic concentrations.



Inhibition zones induced by 10µl Polymyxin B (PxB) or Curosurf plus PxB on agar plates inoculated with ~10⁷ E.coli/200µL

POSTER 14

SOLUBLE CD14 SUBTYPE (SCD14-ST) PRESEPSIN LEVELS IN PRETERM NEWBORNS WITH RDS

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BACKGROUND

Soluble CD14 subtype (sCD14-ST), presepsin, is an early marker for systemic inflammation and sepsis. Respiratory distress syndrome (RDS) is commonly associated with maternal and neonatal inflammation and infections. We aimed to elucidate the relationship between presepsin levels and RDS in the first week of life.

PATIENT AND METHODS

Ninety five preterm newborns who were born and admitted to NICU in 2014 were enrolled in this study. Presepsin levels were analyzed in blood samples from umbilical cord; and on day 1, 3, 5 and 7 consecutively. Antenatal characteristics and early pulmonary outcome were explored in this study.

RESULTS

In our study population mean gestational age was 31.92±2.88 (24-36) weeks; mean birth weight was 1753.85±575.24(610-3110)grams. Thirty seven (42%)newborns had RDS. Infants with RDS had higher presepsin levels starting from umbilical cord blood samples ($p<0.001$); on day 1 ($p=0.034$); day 3 ($p=0.013$), day 7 ($p=0.003$) compared to infants without RDS. Six patients developed bronchopulmonary dysplasia (BPD), but their presepsin levels seemed similar to the levels obtained in patients without BPD.

CONCLUSION

Higher presepsin levels seen in premature infants in the early days of life may be related to RDS as an indicator of inflammation in this group of infants. Small number of BPD cases had similar presepsin levels with the other patients, however this relationship may deserve further evaluation in larger patient populations.

Presepsin, respiratory distress syndrome, infection, inflammation, biomarker.

POSTER 15

TARGETED NEXT-GENERATION SEQUENCING FOR GENETIC DIAGNOSIS OF NEONATAL/ INFANTILE PULMONARY HYPERTENSION

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BACKGROUND

Pediatric idiopathic pulmonary arterial hypertension (IPAH) is a rare but dreadful disorder with a broad spectrum of etiologies and clinical severity. The most severe form, alveolar capillary dysplasia (ACD) is associated with mono-allelic FOXF1 mutations in ~50% of ACD cases. Acinar dysplasia (AD), a severe and poorly defined lung developmental disorder, has no known molecular mechanism; later-onset forms of IPAH are largely heterogeneous.
AIMS: 1. To validate an innovative diagnostic approach through targeted next-generation sequencing (NGS); 2. To identify rare variants of FOXF1 and potential candidate genes in neonates with idiopathic PAH +/- histologic diagnosis of ACD by NGS for single/ oligonucleotide mutations and copy number variation studies (CNV) for larger deletions.

PATIENT AND METHODS

Cases were collected through international collaboration, including infants 0-1 year with neonatal refractory hypoxemia or IPAH. When suitable, DNA was screened for mutations using a custom-made panel of 21 PAH genes plus 8 surfactant genes for differential diagnosis on a MiSeq® platform, and for CNV using CGH arrays. Variants identified were confirmed by Sanger sequencing. Histology was reviewed by two independent pathologists blinded to genetic results.

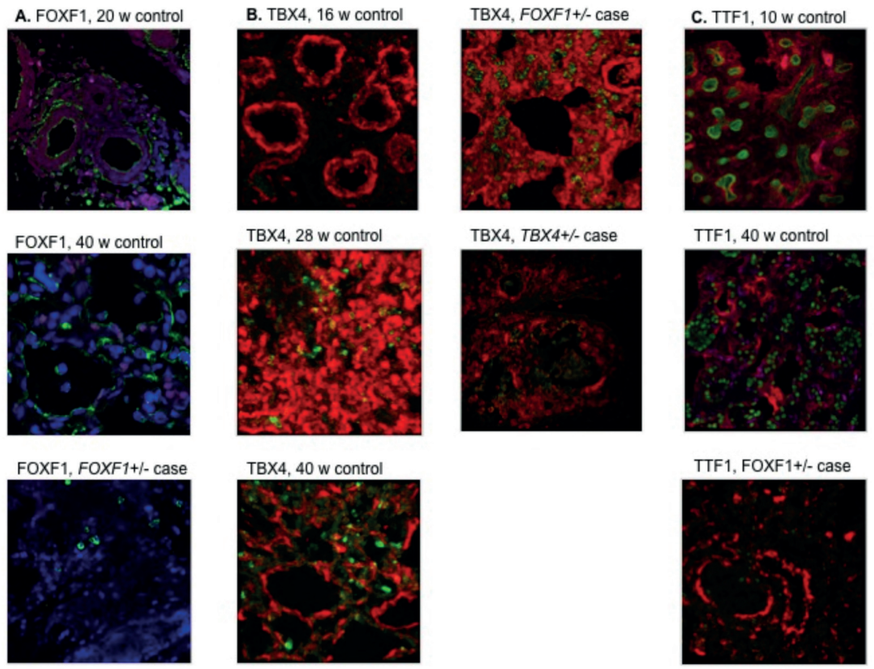
RESULTS

Out of 40 cases recruited, Histology could be analyzed in 33, and DNA in 28. 19 cases had an ACD phenotype, 4 were classified as AD, and 10 remained unclassified. We identified 8 FOXF1 deleterious variants, 6 of which are novel, corresponding to ACD, with or without misalignment of pulmonary veins, the latter associated to less severe clinical course. We identified 3 different possible genes present in the 3 AD cases and some ACD cases: TBX4 (3 cases), MEOX2 (1), NKX2.1 (3).

CONCLUSION

Rare variants in different genes, causing disruptions in pulmonary vascular development, underlie the spectrum of IPAH in neonates and infants. Targeted NGS is rapid and effective for early recognition and genetic diagnosis, both essential for clinical management, counseling and research.

ACD-related gene expression in controls and mutants



Histology	# cases	DNA analyzed	FOXF1 variants	TBX4 variants	NKX2.1 variants	MEOX2 variants	Other
ACD	19	12	7	0	0	0	1
Acinar Dysplasia	4	3	0	1	1	1	0
Other/unknown	10	8	0	1	1	0	1
missing tissue	7	6	1	1	1	0	0
TOTAL	40	28	8	3	3	1	2

IPAH genes: ENG, BMPR2, SMAD1, SMAD5, SMAD9, ACVRL1, TBX4, FOXF1, MEOX2, CBLN2, CRHR1, CRHBP, PPARg
Surfactant genes: SFTPA1, SFTPA2, SFTPB, SFTPC, SFTPD, ABCA3, NKX2.1, CSFR2B

POSTER 16

EFFECT OF EXTERNAL INSPIRATORY LOADING ON DIAPHRAGMATIC FUNCTION OF PRETERM INFANTS WITH AND WITHOUT CHRONIC LUNG DISEASE

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BACKGROUND

Preterm infants with chronic lung disease (CLD) may be at risk of developing respiratory muscle fatigue, especially under conditions of increased respiratory loading. The diaphragmatic pressure-time index (PTIdi) reflects the relationship between the diaphragmatic pressure-generating capacity and the load imposed upon it; in adults, a PTIdi greater than 0.15 may indicate impending diaphragmatic fatigue. The aim of this study was to compare the diaphragmatic function before and after application of inspiratory flow-resistive loading in preterm infants with and without CLD.

PATIENT AND METHODS

Fifteen preterm infants (median GA 30 weeks, range 25–32) were studied prior to discharge from the NICU. Six infants had CLD, defined as supplemental oxygen requirement more than 28 days after birth. All participants were breathing on room air when measured. The PTIdi was calculated as the product of the mean to maximum transdiaphragmatic pressure ratio (Pdimean/Pdimax) and the inspiratory duty cycle (Ti/Ttot). The mean PTIdi of 10 consecutive breaths was computed before and during the application of an inspiratory-flow resistance of 200 cmH2O.

RESULTS

The baseline PTIdi was higher in infants with CLD as compared to controls (0.119 [0.085–0.144] vs. 0.068 [0.032–0.085]; P<0.001). After the application of inspiratory resistance, the PTIdi increased and remained significantly higher in infants with CLD (0.201 [0.161–0.444] vs. 0.117 [0.086–0.189]; P=0.005). In the CLD group all infants exceeded the diaphragmatic fatigability threshold of 0.15 when exposed to inspiratory loading, as opposed to the non-CLD group where only 2 infants (22.2%) exceeded the respective value (P=0.006).

CONCLUSION

In preterm-born infants, CLD is associated with higher risk of diaphragmatic muscle fatigue under conditions of increased inspiratory loading.

POSTER 17

IS SERUM PROCALCITONIN LEVEL A RELIABLE INDICATOR IN EARLY DIAGNOSIS AND TREATMENT OF CONGENITAL PNEUMONIA?

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BACKGROUND

The clinical signs in congenital pneumonia mimic other conditions like transient tachypnea of the newborn (TTN) and respiratory distress syndrome (RDS). Differential diagnosis is difficult since laboratory findings have limited value. Procalcitonin (PCT) is an important and widely studied marker of infection. The aim of this study is to determine the diagnostic value of PCT in newborn patients hospitalized in NICU with the diagnosis of congenital pneumonia.

PATIENT AND METHODS

The infants with respiratory distress who was born in Hacettepe University between 2005-2015 and hospitalized in neonatal intensive care unit (NICU) were included in the study.

RESULTS

A total of 179 newborn infants; 54(30%) infants with congenital pneumonia (Group-1), 43 (23%) infants with TTN (Group-2), 18 (11%) infants with RDS (Group-3) and 64(36%) healthy infants (group-4), were included in the study. There were no statistically significant difference between groups for the serum C-reactive protein (CRP) levels, gestational weeks, birth weights, sampling time for PCT and CRP and the characteristics of the mother ($p > 0.05$). Mean serum PCT level was higher in congenital pneumonia group than other groups ($p < 0.005$).

CONCLUSION

Result of this study shows that procalcitonin is an important early marker in the diagnosis of congenital pneumonia.

POSTER 18

OUTCOMES AMONG PREMATURE INFANTS WITH RESPIRATORY DISTRESS SYNDROME (RDS) TREATED WITH SURFACTANTS: A RETROSPECTIVE STUDY

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2 Quintiles
3 Chiesi USA
4 Indegene

BACKGROUND

This study evaluated the effects of use of surfactants in premature infants with RDS treated in neonatal ICUs (NICUs). Pre-defined endpoints were use of mechanical ventilation (MV) on days 3 and 7, NICU length of stay (LOS), NICU mortality and total hospital costs.

PATIENT AND METHODS

Retrospective data (Premier Healthcare Database) were evaluated from infants with RDS born in the hospital between 2010 and 2013, with gestational age 25-36 weeks, and birthweight ≥500 grams, who were ≤2 days old on the day of first surfactant administration in a Level III or IV NICU. Infants were grouped according to the surfactant used: beractant, calfactant, or poractant alfa. Outcomes were modeled using hierarchical multivariable regression.

RESULTS

A total of 13,240 infants met selection criteria; 31.2% received beractant, 18.9% calfactant, and 49.9% poractant alfa. Compared to poractant alfa, beractant and calfactant were associated with greater adjusted odds of MV use on day 3 (OR=1.56 [95% CI: 1.32-1.84] and 1.60 [1.28-2.00], respectively) as well as on day 7 (OR=1.39 [1.16-1.67] and 1.28 [1.01-1.61], respectively) (all $p<0.05$). Adjusted NICU mortality was significantly higher with calfactant than with poractant (OR=1.51 [1.08-2.11], $p=0.015$). No significant differences between groups were found in adjusted mean costs or NICU LOS (all $p>0.05$).

CONCLUSION

This large retrospective database study showed that there are differences between surfactants in terms of select relevant clinical outcomes in this vulnerable patient population, whereas NICU LOS and costs were comparable.

POSTER 19

HEART RATE VARIABILITY ANALYSIS FOR PAIN ASSESSMENT IN PRETERM INFANTS TREATED WITH DIFFERENT SURFACTANT ADMINISTRATION TECHNIQUES

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BACKGROUND
We aimed to assess the pain perception of preterm infants treated with different surfactant administration techniques by using heart rate variability.

PATIENT AND METHODS
Preterm infants who required surfactant therapy for respiratory distress syndrome (RDS) were randomized to Insure or Take Care Groups. Poractant alpha was administered to all study infants. Heart rate variability (HRV) analysis was performed by Newborn Infant Parasympathetic Evaluation monitor (Mdoloris Medical Systems, France). HRV of each infant were recorded consecutively: before surfactant administration, during surfactant administration and after surfactant administration. Pain assessment was also determined by Premature Infant Pain Profile (PIPP) scores.

RESULTS
Fourteen infants were enrolled in the study. There was no significant difference in demographic characteristics of the groups. PIPP scores also did not differ between infants in Insure and Take Care groups (p=0.05). Statistically significant difference in median HRV of infants during surfactant administration was observed between Insure and Take Care groups (52 vs 56, p=0.03). HRV analysis before and after surfactant administration were similar between the groups.

CONCLUSION
These findings suggest that surfactant administration with Take Care technique might be more comfortable for preterm infants with RDS. However further studies with larger series are needed.

POSTER 20

THE EFFECT OF CAFFEINE ON EXPERIMENTAL BILIRUBIN TOXICITY IN NEWBORN RAT ASTROCYTES

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BACKGROUND
Neurotoxicity caused by hyperbilirubinemia is still an important problem despite recent developments of newborn care. Bilirubin has an antioxidant effect at physiologic levels but, may cause oxidative damage at high levels. Furthermore, even lower bilirubin levels may lead to neurologic damage in preterms due to immature antioxidant enzyme systems. Caffeine used in the treatment of premature apnea was detected to decrease the neuron damage due to hypoxia, hyperoxia and neurotoxins in the experimental studies. In previous clinical studies, caffeine was shown to decrease mechanical ventilation requirement, the frequencies of bronchopulmonary dysplasia, patent ductus arteriosus, cerebral palsy and neurodevelopmental disorders at 18-21 months, and improve the white matter structure in the very low birth weight babies. But the effect of caffeine in the hyperbilirubinemia was not clarified yet.

Aim: To investigate the effect of caffeine on experimental bilirubin toxicity in newborn rat astrocytes.

PATIENT AND METHODS
was detected as 50 μM on astrocyte cells. Caffeine concentration increasing cell viability 100% was found as 100 μM. Apoptosis was evaluated by TUNEL assay. The expression levels of antioxidant enzymes, proinflammatory cytokines, Toll-like receptors (TLR) were evaluated in control, bilirubin, caffeine, caffeine before bilirubin exposure, and caffeine after bilirubin exposure groups using Elisa teqhnique.

RESULTS
Bilirubin was shown to increase apoptosis, malondialdehyde, total nitrate/nitrite, interleukin (IL)-1β, IL-6, tumor necrosis factor-α, TLR 4 levels, and decrease cell viability, catalase, glutation peroxidase and superoxide dismutase activities, and glutathione, TLR9 levels. Prophylactic and therapeutic caffeine administration inhibited these detrimental effects of bilirubin

CONCLUSION
In conclusion, prophylactic and therapeutic caffeine have antiapoptotic, antioxidant, antiinflammatory and antinitrosative properties against bilirubin neurotoxicity, and caffeine use seems encouraging for prevention of bilirubin neurotoxicity in preterms.

POSTER 21

A CONTINUOUS QUALITY IMPROVEMENT INITIATIVE TO REDUCE NOSOCOMIAL INFECTION RATES

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BACKGROUND

The Regional Neonatal Unit Northern Ireland benchmarks against the Vermont Oxford Network (VON). In 2009-10, there was a high incidence of late onset infection (nosocomial infection occurring after 72 hours of age) caused by Coagulase negative staphylococcus (CoNS), in very low birth weight (VLBW) babies. CoNS sepsis is associated with central line infections and can cause significant short and long-term morbidity for premature babies. A multidisciplinary quality improvement team was therefore established, aiming to reduce the frequency and impact of nosocomial infection in neonates.

PATIENT AND METHODS

The measures of improvement were the CoNS infection rate and the central line associated blood stream infection rate per 1000 catheter days (CLABSI).

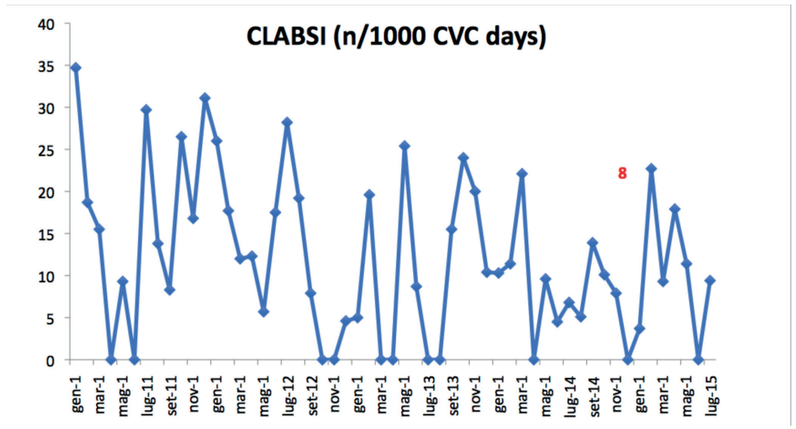
Interventions:

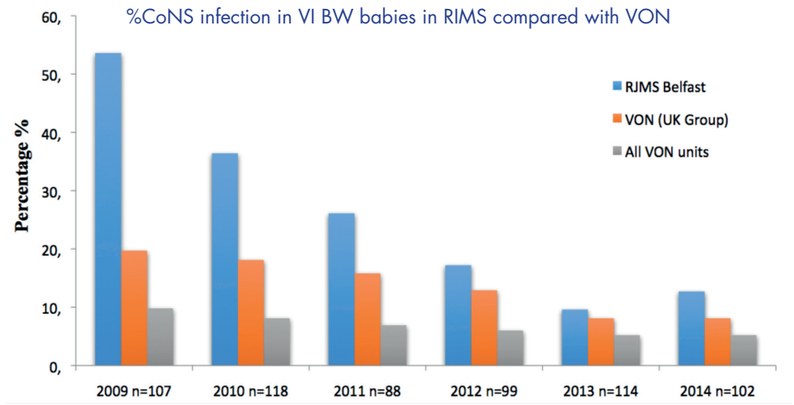
- Regular staff updates.
- Regular, independent hand washing audits with timely feedback.
- Regular teaching & audits on aseptic non-touch technique.

See run chart for timeline of interventions.

1. QI talks to staff
2. Introduction of new guidance on skin preparation for invasive procedures.
3. Revision of an enteral feeding protocol to reach full enteral feeds faster permitting earlier removal of central lines.
4. Review of the Medical staff induction including DVD based teaching on hand washing, use of an arterial line, donning PPE and blood culture taking.
5. Audits of skin breakages in the smallest babies.
6. Audits of central line care.
7. High impact intervention tool on blood culture taking.
8. Engaging with parents to ensure good hand hygiene & parental hand hygiene audit.

RESULTS





CONCLUSION

- The considerable improvement in infection rates was brought about by multiple interventions, education and cultural change. Nosocomial Infection is no longer seen as inevitable for these vulnerable babies.
- Comparison within VON suggests that further improvements can be achieved.
- The slight increase in the CoNS bacteraemia rate in 2014 emphasizes the need for consistent & persistent focus on change.

POSTER 22

ROUTINE ANTITHROMBIN III REPLACEMENT DURING NEONATAL EXTRACORPOREAL MEMBRANE OXYGENATION

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BACKGROUND

Hypoxic respiratory failure that does not respond to surfactant use and inhaled nitric oxide necessitates the use of extracorporeal membrane oxygenation [ECMO]. While the latter has excellent outcomes depending on the disease entity, it continues to have mechanical and thrombotic complications. At our institution, we started examining the role of Antithrombin III [AT3] to improve hemostasis and established a routine based on our initial experience since "normal" levels are not well established.

PATIENT AND METHODS

Objective: To examine the effect of routine AT3 infusion on blood product utilization, hemorrhagic and thrombotic complications, and circuit lifespan in neonatal ECMO.

Study Design: Retrospective cohort study of 162 infants placed on ECMO for hypoxic respiratory failure at a single, tertiary care center between 2002 and 2014. Infants requiring ECMO for primary cardiac support were excluded. Demographic data, time on ECMO, blood product usage, coagulation profile, and complications were compared between 90 control patients and 72 patients treated with AT3.

RESULTS

The cohort receiving routine AT3 replacement received less total blood product infusion [54.7 ± 20.1 vs. 67.4 ± 34.9 mL/kg/day] and more total heparin [730 ± 170 vs. 660 ± 260 units/kg/day] during ECMO. Tighter control of activated clotting time and higher serum heparin Xa levels were observed in infants receiving routine AT3 replacement. Infants receiving AT3 replacement showed a significant reduction in thrombotic complications and a non-significant reduction in bleeding complications as compared to controls. ECMO circuit lifespan did not differ between cohorts. However, subgroup analysis of the 0-25th and 26th-50th percentiles in each group revealed a 30% increase in circuit lifespan for infants below the 25th percentile receiving AT3 replacement as compared to the 25th percentile control cohort [87.2 ± 20.8 vs. 66.33 ± 24.6 hours].

CONCLUSION

Routine administration of AT3 in neonates receiving ECMO therapy was associated with improved circuit maintenance and a reduction in thrombotic events that may prolong circuit lifespan.

POSTER 23

BEDSIDE BLOOD GAS VS LABORATORY ANALYSIS OF SODIUM: IS THERE A DIFFERENCE?

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BACKGROUND

The aim is to compare sodium levels measured by indirect-ISE and direct-ISE in infants and evaluate the effect of albumin levels on these measurements.
Sodium levels are assessed by central laboratory analyzers using indirect ion selective electrodes (ISE) or blood gas analyzers using direct-ISE. Sodium levels from indirect-ISE are thought to be affected by protein levels in the blood, as indirect-ISE analysis assumes a constant protein concentration present in the plasma water. High protein levels can give falsely low sodium levels and low protein levels can give spuriously elevated or seemingly normal sodium levels when analyzed with indirect-ISE. Infants have less serum protein compared to older children, thus it is vital to understand how protein status affects measured serum sodium.

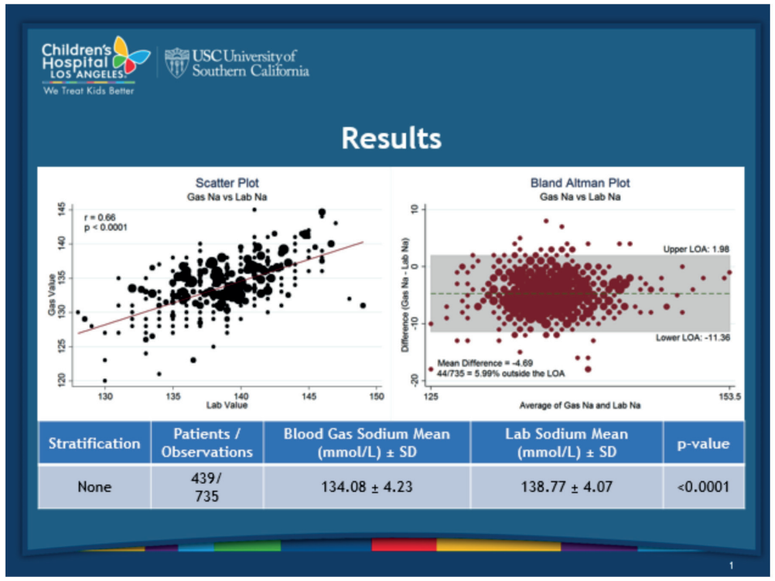
PATIENT AND METHODS

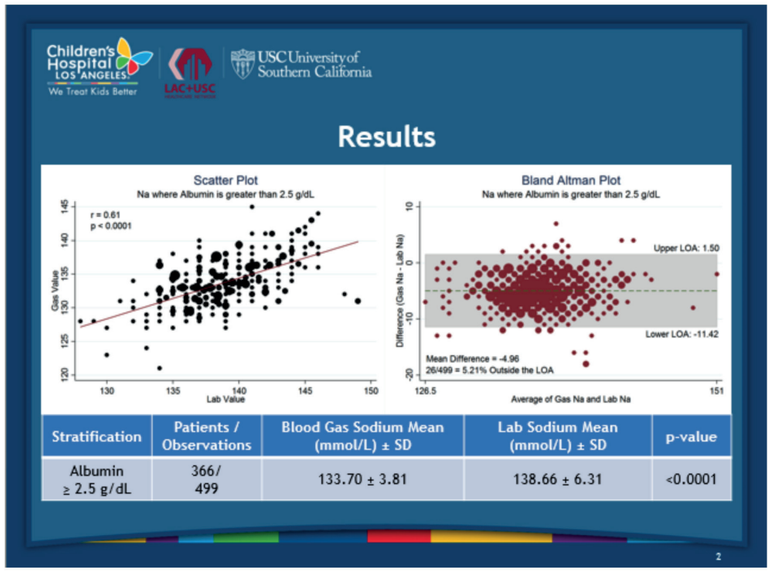
Retrospective data collection from a single center, community level IIIa NICU from January 2012 – December 2014.

Study cohort had at least one electrolyte panel assessed in the laboratory and a blood gas analysis performed within 20 minutes of each other. Paired t-test & Bland-Altman analysis were performed to determine differences and agreement between direct-ISE and indirect-ISE measurements. Clinical significance was defined as >3mmol/L difference (indirect-ISE – direct-ISE).

RESULTS & CONCLUSION

Blood gas analyzer mean sodium was significantly lower compared to laboratory mean sodium. The difference in sodium levels (indirect – direct ISE) was both statistically as well as clinically significant. Bland Altman plots displayed a bias (mean difference) of -4.69 mmol/L when comparing laboratory to blood gas sodium levels. These trends persisted after stratifying by albumin levels.





POSTER 24

COMPARING PRACTICE IN NORTHERN IRELAND WITH GUIDANCE ON ANTIBIOTIC MANAGEMENT OF EARLY ONSET NEONATAL SEPSIS: NICE?

C. Anderson 1, C. Mayes 2, M. Hogan 3

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1 Royal Maternity Hospital
2 Royal Maternity Hospital
3 Craigavon Hospital

BACKGROUND

Infection accounts for 7.9% of neonatal deaths in the UK (1). The Neonatal Network for Northern Ireland (NNNI) has agreed upon an adaptation of the NICE clinical guideline "Antibiotics for early-onset neonatal infection" (2,3).The aim is to ensure prompt management of infants with early onset infection, whilst ensuring timely cessation of treatment when the initially suspected sepsis does not manifest. This is particularly relevant in an era of emerging drug resistance, where antibiotic stewardship is vital.

PATIENT AND METHODS

Each neonatal unit collected information regarding 30 infants commenced on antibiotics in the first 72 hours of life. Data regarding the audit standards was recorded, with an option of up to three further local standards, to allow for observation of variations in practice.

RESULTS

The attached table outlines the results. All units perform well in ensuring initial blood culture and CRP samples are obtained. The one-hour window for treatment initiation is the target least often realised. However, these babies often had more pressing clinical concerns, such as respiratory compromise. Antibiotic treatment of well babies identified as being at risk of sepsis can be delayed due to other perceived clinical priorities. This is an area that should be highlighted for caution.

CONCLUSION

There is reassuring evidence of adherence to this guideline. Some units still require logistical changes to facilitate full adoption of the guidance. How this can be achieved will be discussed between stakeholders within NNNI, sharing ideas and resources. Prompt administration of antibiotics in sepsis must remain a clinical priority.

Table summarising comparison of practice in Northern Ireland's Neonatal Units with the NICE guideline "Antibiotics for early onset neonatal infection" (2).

Audit Standard	Proportion of babies for which standard Achieved Unit 1 (%)	Proportion of babies for which standard Achieved Unit 2 (%)	Proportion of babies for which standard Achieved Unit 3 (%)	Proportion of babies for which standard Achieved Unit 4 (%)	Proportion of babies for which standard Achieved Unit 5 (%)
All babies with EONS should have blood culture before antibiotics	100	100	100	100	100
All babies with EONS should have baseline CRP measured	100	100	98	100	100
All babies managed for EONS should have antibiotics within 1 hour	53	70	65	80	92
Antibiotics for EONS should be Gentamicin & Benzylpenicillin	100	100	100	100	100
Benzylpenicillin should be given as 25mg/kg twice daily	90	100	0	93	100
Gentamicin dose 5mg/kg	100	100	100	100	100
CRP should be measured 18-24 hours after presentation	90	73	70	100	100
Blood culture results available after 36 hours	100	97	0	100	8
Local standard: Benzylpenicillin dose 60mg/kg twice daily	0	0	100	0	0
Local standard: Blood culture results available after 48 hours	100	100	100	100	83
Local standard: Gentamicin trough measured up to maximum of 6 hours before appropriate dose	100	183	98	87	100

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The Certificate of Attendance will be distributed at the end of the Congress.

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Speakers are kindly requested to hand their presentations to the congress
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Poster Presenters are kindly requested to hang their posters at the beginning of the day assigned and take them down at the end of the same day.
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OFFICIAL LANGUAGE

English is the official language of the Congress.

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