# NeoCORE Conference Abstracts

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ABOUT NeoCORE

Neonatal Conference On Research and Expert talks (NeoCORE) is an annual conference jointly organized by Departments of Neonatology of Sri Ramachandra Institute of Higher Education and Research (SRHIER), Chennai; Christian Medical College (CMC), Vellore; and Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Puducherry. There had been three successful conferences conducted in turns since 2017, with good response every time. The fourth annual conference ‘NeoCORE 2020’ was conducted by SRHIER from March 12 -15, 2020 at Chennai.

The main objective of the conference is to encourage high-quality research in Neonatology in India. The conference serves as a platform to present research works in Neonatology to eminent faculty for critical appraisal. There was a total of 31 abstracts for podium presentations, submitted by delegates from leading institutions across the country. Gold medal and cash awards were given to the best five papers, that were selected based on the combined score from the evaluations based on a pre-defined scoring system of the blinded manuscript prior to the conference and podium presentation during the conference.

In addition, there were expert talks by pioneer Neonatologists from all over India. This included the ‘Dr R Shannugamundaram Oration’ on “Traversing the Journey from Evidence to Clinical Practice” delivered by renowned Neonatologist, Professor Siddharth Ramji from Maulana Azad Medical College, New Delhi. There were 11 expert talks and one debate. The audience were Neonatology residents doing DM, DNB or Fellowship, as well as practicing Neonatologists. In view of travel restrictions due to COVID-19, two sessions were conducted using an online platform and they were attended online by many neonatologists across the country, in addition to the delegates of the conference.

Two pre-conference workshops were also conducted. One was ‘Research Methodology and Biostatistics – Basic and Advanced’ with Professor Sourabh Dutta, PGIMER, Chandigarh as the lead instructor. The second was an innovative workshop on ‘Next-Gen Learning’, first of its kind in a medical conference, in which the delegates were taught advanced functions of basic softwares such as microsoft word, powerpoint and excel, research related softwares such as Zotero and SPSS, online teaching platforms such as Kahoot and Moodle and search strategy for evidence. The lead instructors for the latter workshop were Professor Prakash, SRHIER, Chennai, and Dr Nishad Phakkal, JIPMER, Puducherry.

Over the years, we envisage NeoCORE to serve as a desired platform for researchers in Neonatology to look forward for presenting their high-quality research and to have expert talks based on the expert’s own research. It gives us immense pleasure to announce the grand success of NeoCORE 2020 under the patronage of Professor Vishnu Bhat and ProfessorBinu Ninan. We take this opportunity to invite you to participate in the fifth annual conference ‘NeoCORE 2021’ to be held in CMC, Vellore.

It is a great honour and privilege to publish the abstracts of research papers presented in NeoCORE 2020 in ‘Indian Journal of Pediatrics’ and we extend our sincere thanks to the JP publishers.

CONFERENCE ABSTRACTS

PAPERS AWARDED GOLD MEDAL

1. Comparison of the effect of non-nutritive sucking and cold compression on pain during heel stick procedure among preterm neonates- A randomized controlled trial
Soumi Pal1, Sivam Thanigainathan2, Vetriselvi P1
1College of Nursing, 2Department of Neonatology, Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry
Corresponding author: Sivam Thanigainathan
Email: thanigaipaeds@yahoo.com

Importance: Effective pharmacological and non-pharmacological methods are available to control pain. Non-nutritive sucking is one of the non-pharmacological methods used widely in reducing pain but this method requires extra manpower in addition to the person doing the procedure.

Objective: To compare the effect of non-nutritive sucking (NNS) and cold compression (CC) in reducing pain during heel prick in preterm neonates.

Design, setting and participants: This was an unblinded parallel randomized controlled trial, done in tertiary care neonatal unit. The authors recruited 242 preterm infants (121 in each group) ≥28 wk gestational age, admitted in NICU.

Methods: After getting written consent from the parents, babies were assigned to either of two groups. For group 1 babies (NNS), mothers were instructed to wash their hands and to start non-nutritive sucking before 1 min of the heel prick using her little finger. For group 2 babies (CC), the cold compression was given to the baby using 2X2 cm size ice cubes covered by thin cling wrap sheet and was kept for 20 s over the lateral aspect of the sole. Physiological parameters and pain score using NIPS pain scale were measured before, during, after one minute, after two minutes and after 4 min of the heel prick for both groups.

Results: Group 1 and group 2 had equal distribution of gender, birth weight and gestational age. There was no difference in the severity of pain perception during and one minute after the prick (P 0.801 and 0.211 respectively) between two groups. But, mild to moderate pain persisted till 2 min after the heel prick for group 2 babies than group 1 babies (5.8% vs. 0.8% respectively, P 0.03). After 4 min of prick, no baby was in pain.

Conclusions and Relevance: More babies perceived pain for more than two minutes after heel prick in cold compression group than in NNS group. Hence, non-nutritive sucking was more effective in reducing the pain due to heel prick than cold compression.

Trial registration details: CTRI/2019/08/020749

2. RAM Cannula versus Hudson prongs for delivery of CPAP in preterm infants for reducing nasal injuries: A randomized controlled multicenter trial
Shravani Maram, Srinivas Murki, Subash Arun
Department of Neonatology, Fernandez Foundation, Hyderabad
Corresponding author: Srinivas Murki
Email: srinivasmurki2001@gmail.com

Objective: To compare the incidence and severity of nasal injury at the removal of CPAP in the two groups (Hudson prong and RAM cannula).

Patients and Methods: Neonates with gestational age between 28-34 wk and birth weight ≥1000 g and with respiratory distress needing nasal CPAP were enrolled. Enrolled infants were randomly allocated to either CPAP with Hudson prongs or with RAM cannula using computer generated random numbers. Appropriately sized prongs were used in both the groups. Cannula id was used for creating zero leak at nostril in the RAM group. All enrolled infants were monitored and assessed for nasal injury using a standard nasal injury score every 8 hourly. Relevant infant data was collected prospectively from admission till discharge.

Results: Two hundred twenty nine infants were enrolled. Of these, 112 infants were randomized to RAM cannula and 117 infants to Hudson prongs. Both groups were comparable for all the baseline characteristics. Any nasal injury at CPAP removal was significantly lower in the RAM cannula group [n=6 (5.4%) vs. n=31 (24.8%), P=0.0001]. Moderate nasal injury was present in 2 (1.7%) infants in the Hudson prongs group. None of the study infants had severe nasal injury. Any nasal injury at discharge was lower in RAM group [n=40 (0%) vs. n=4 (3.4%) P= 0.048]. Need for mechanical ventilation in the first 72 h was similar between the two groups [RAM cannula 9.8% vs. Hudson prongs 11.4% P=0.750]. Nasal interface was changed in 8 infants in Hudson prongs and in 1 infant in the RAM group. The median duration of CPAP was higher in the RAM group, P=0.041.

Conclusions: For preterm infants supported with nasal CPAP, any nasal injury was significantly lower in infants with RAM cannula compared to Hudson prongs.
3. Role of 40% oral dextrose gel on prevention of hypoglycemia in Infants of Diabetic Mother (IDM) – A randomized controlled trial

Sivam Thanigainathan1, Madhan Kumar P1, Anandurai2, Grace Varghese3, Srihar Santhanam1, Grace Rebekah4

Department of 1Neonatology, 2Pharmacy Manufacturing Unit, 3Biochemistry, 4Biostatistics, Christian Medical College, Vellore

Corresponding author: Sivam Thanigainathan
Email: thanigaipaeds@yahoo.com

Objective: To study the effect of prophylactic 40% oral dextrose gel on prevention of neonatal hypoglycemia in infants of diabetic mothers (IDM) compared to the standard of care (early, prolonged and frequent breastfeeding with strict thermoregulation).

Methods: This was an open label, parallel design, randomized controlled trial, done in a tertiary care neonatal unit. Infants of diabetic mothers born in authors’ unit with > 35 wk and > 2 Kg and not requiring admission were enrolled in this study. Total 600 babies were randomized to either the study group or the standard of care group. After randomization, 200 mg/kg of 40% oral dextrose gel was applied to the buccal mucosa of infants in the study group. The standard of care including breastfeeding within 30-60 min of birth, prolonged as well as frequent breastfeeding, and strict thermoregulation were followed in both the groups. Blood sugars were checked as per unit protocol till 24 h of life. Infants with symptomatic, severe or recurrent hypoglycemia were admitted to NICU and the same treatment protocol was followed for both the groups.

Results: Incidence of hypoglycemia in study group and control group were 2% and 4% respectively (P 0.15). There was no difference in neonatal admission due to hypoglycemia, incidence of recurrent and severe hypoglycemia between two groups. Incidence of hyperglycemia was more in the study group (P 0.01).

Conclusions: Prophylactic use of oral 40% dextrose gel is not superior to standard of care in reducing the incidence of hypoglycemia in IDM infants.

4. Short term outcome and predictors of survival among late preterm and term infants with moderate to severe hypoxic ischemic encephalopathy in the Indian Neonatal Collaborative (INNC)

Chanchal Kumar1, Guruprasad Perur1, Nishad Plakkal1, Praveen Kumar2

1Department of Neonatology, JIPMER, Puducherry, 2Division of Neonatology, Department of Pediatrics, PGIMER, Chandigarh

Corresponding author: Nishad Plakkal
Email: plakkal@gmail.com

Background: Among term and late preterm infants, hypoxic ischemic encephalopathy (HIE) contributes to 20% of all neonatal deaths in India.

Objectives: The primary objective was to study the incidence of survival to discharge among late preterm and term infants with moderate or severe HIE. Secondary objectives were to explore variation in HIE across participating sites and to identify the predictors of survival.

Methods: It was a retrospective cohort from INNC database. Survival to discharge was estimated for the whole cohort and individual centers. A multivariable logistic regression model was constructed to identify the predictors of survival. P <0.05 was considered significant.

Results: Of 352 term (37-42 wk) and late preterm (34-36 wk) infants with moderate or severe HIE from 2018-2019, 82% survived to discharge. 59% of these infants received therapeutic hypothermia (TH). Phase change material based devices were most commonly used for TH. After adjusting for confounders, severe HIE (aOR 0.04; 95% CI 0.02-0.10) and PPHN (aOR 0.22; 95% CI 0.08-0.61) were independently associated with decreased odds of survival to discharge.

Conclusions: Survival to discharge among infants with moderate to severe HIE was >80% in most centers. Severe HIE and PPHN decreased the odds of survival to discharge.

5. Partners in care: Implementing family centered care in the neonatal intensive care unit

Santhy Selvam1, Punnagai N2, Manju2, Chanchal Kumar2, Bethou Adhivasan3, Sindhu Sivanandan4

1College of Nursing, 2Department of Neonatology, Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry

Corresponding author: Sindhu Sivanandan
Email: dsindhusivanandan@gmail.com

Objective: Family-centered care (FCC) in the neonatal intensive care unit (NICU) facilitates mother-infant bonding with potential benefit for the parents and infants. In this quality improvement initiative (QI), authors planned to effectively implement FCC (defined as proportion of eligible infants receiving FCC on a daily basis) from a baseline of 30% to 80% among stable infants admitted in level-2 NICU over a period of 6 mo through parental education and parental capacity building.

Methods: This QI is based on a model for improvement and done in three phases; baseline (1 mo), intervention (three months) and post-intervention period (2 mo) from August 2019 to January 2020. Neonates admitted in level-2 NICU were eligible for FCC if they had at least one female family member willing to allocate 6 h a day for neonatal care. Neonates with major malformations, hemodynamic instability and those requiring respiratory support were excluded.

In PDSA cycle-1 authors created educational videos for parents in Tamil language familiarizing them with NICU, preparing them for entry to NICU and how they could contribute to their infant’s care. This was reinforced with one-to-one training by the bed-side nurse on general care, feeding and Kangaroo care. In PDSA cycle-2, authors identified FCC champions among mothers and facilitated peer teaching and motivation. The primary outcome was the proportion of eligible neonates receiving FCC.

Results: The proportion of eligible mother-infant dyads involved in FCC increased from a mean of 33% in baseline phase to 44% during intervention phase and further to 66% in post intervention period. The authors did not observe an increase in culture positive sepsis (12 per 100 NICU admissions at baseline) or any inadvertent event during the study period.

Conclusions: The QI initiative involving parents as partners in care could be implemented successfully in the NICU.

OTHER PAPERS

1. A quality improvement initiative to reduce feed interruption rates in hospitalized neonates

Siddharth Madabhushi, N Chandrakumar, Vaanathi, Shanmugam Sundaram

Department of Neonatology, Kanchi Kamakoti Childs Trust Hospital, Chennai

Corresponding author: N Chandrakumar
Email: drchandrakumar@gmail.com

Introduction: Achieving early initiation of enteral feeds and advancement of enteral feeds should be a priority in every NICU. Feed interruptions may result in extra uterine growth retardation- a known risk factor for poor neurodevelopmental outcome, especially in VLBW babies. In view of this, a team was assembled and a QI project was initiated with the primary objective being reduction in unnecessary feed interruptions.

Objectives: The primary objective was reduction in unnecessary feed interruptions as part of a quality improvement initiative. The secondary objective was to develop and maintain a written feeding policy to ensure sustained compliance.
Methods: This project was undertaken in a Level III NICU, catering exclusively to outborn neonates. A QI team was assembled and after a fishbone analysis of problems were identified, a written feeding policy was developed. After three PDSA cycles and looking at run charts for feedback, feed interruption rates were recorded post intervention.

Results: Post intervention, the total feed interruptions reduced from a baseline 44 to 19. The total rate expressed as a percentage of interruption hours and feed hours reduced from a baseline 18% to 6%.

Conclusions: The implementation of the QI initiative significantly decreased the feed interruption rates from 18% to 6%.

2. Assessment of age of achievement of full oral feeding and its associated factors among very preterm neonates – A prospective observational study

Sawad E. Bhowmick1, P. Vetriselvi2, Sindhu Sivanandan2
Department of 1Nursing and 2Neonatology, JIPMER, Puducherry
Corresponding author: Sindhu Sivanandan
Email: drsindhusivanandan@gmail.com

Importance: Competency at oral feeding is a must for hospital discharge among preterm neonates admitted to NICU. They are at risk of various morbidities during hospital stay that influences achieving feeding milestones.

Objectives: This study aimed to assess the progression of feeding milestones and factors influencing the age of achievement of full oral feeding in very preterm neonates (28-32 wk of birth GA) admitted to NICU.

Methods: This prospective observational study included 178 very preterm neonates admitted in NICU during August and September 2019. The authors used a convenient sampling technique that enrolled neonates tolerating any volume of milk for three consecutive days. They excluded neonates with major congenital malformations, craniofacial anomalies, surgical conditions of gastrointestinal tract and death during hospitalization. The authors collected data on demographics, morbidities and feeding milestones during hospital stay after obtaining informed parental consent. The feeding milestones assessed were, age at first enteral feeding, first oral feeding, and full oral feeding.

Results: Fifty six neonates belonged to 28-29 wk GA category and 122 to 30-32 wk GA category. The PMA of initiation and achievement of full oral feeding were (mean ± SD) 30.38±1.169 and 34.34±1.020 wk respectively. Infants belonging to the 28-29 wk GA category required gavage feeding for a longer duration compared to those belonging to the 30-32 wk GA category (21.70±4.939 vs. 14.24±5.722 d). However, both the GA categories achieved full oral feeds at similar PMA (34.64±1.167 wk compared to 34.20±0.918 wk).

Conclusions: In this study, the age of achievement of full oral feeding among very preterm neonates was 34 wk. Although the duration of gavage feeding was greater among 28-29 wk category, this group also achieved full oral feeding at 34 wk PMA despite being at higher risk of morbidities.

3. A quality improvement project to improve functioning of donor human milk bank

Sylvia Jabakani, Divya P, Krishna K, Vijaya Calevanane, Bethou Adhisivam, Sindhu Sivanandan
Department of Neonatology, JIPMER, Puducherry
Corresponding author: Sindhu Sivanandan
Email: drsindhusivanandan@gmail.com

Background: Mother’s milk is the ideal food for a neonate. When mother’s milk is unavailable for any reason, pasteurized donor human milk is the next best option.

Objective: This quality improvement project evaluated the effect of a multipronged intervention for improving voluntary donation in a public human milk bank (HMB) in South India.

Methods: Between January 2018 and June 2019, the HMB received an average of 15 L of donor milk per month (0.5 L/d). The aim was to increase voluntary milk donation by 50% from baseline over a period of 6 mo using QI methods. Two PDSA cycles were done during the intervention period (4 mo). In cycle-1, multiple micro teams were formed in all the postnatal wards to promote exclusive breastfeeding, trouble-shoot breastfeeding issues and to form a liaison with the core QI team. A Whatsapp group was used for networking among the teams. A separate milk expression area was created in the postnatal ward. In cycle-2 authors focused on counselling postnatal mothers for milk donation and addressed supply chain issues like sterile pumping accessories. The QI efforts were sustained in the post intervention phase (2 mo) by monthly staff appraisal and feedback.

Results: The average daily donation to HMB increased from 0.83 L/d in the baseline phase to 1.28 and 1.11 L per day in the intervention and post-intervention phases. The volume of pasteurized donor milk disbursed from HMB increased from 26.67 (3.2) L/mo to 34.75 (9.3) L/mo; p=0.05 after QI. The number of mothers donating milk per month did not change significantly during the study period.

Conclusion: A multi-pronged effort focusing on exclusive breastfeeding improved voluntary milk donation in HMB bank. Multiple micro-teams and local networking facilitated the QI initiative.

4. A quality improvement initiative to reduce postnatal growth failure in very low birth weight infants

Gokuldas P K, Nivedita Mondal, Sreekumaran Nair, Nishad Plakkal
Department of Neonatology, JIPMER, Puducherry
Corresponding author: Nishad Plakkal
Email: plakkal@gmail.com

Background: Postnatal growth failure (PGF) is a major morbidity of VLBW infants, which can have long term effects.

Objective: The primary objective was to reduce the PGF rate of VLBW infants by 20%.

Methods: This was a quality improvement project in a tertiary care NICU. The authors included all inborn VLBW infants not having major congenital anomaly or genetic and metabolic disorders. Baseline phase was November and December of 2018 and intervention phase was between January and July. Interventions included introduction of new feeding protocol, feedback for the stakeholders in person or via messages, education of mothers for breastfeeding and Kangaroo mother care, peer group teaching by mothers and providing tags for adequately growing babies. Progress was plotted in run charts. SPSS and MS Excel were used for the analysis.

Results: Study sample included 85 infants (57.7% males) in baseline phase and 160 infants (58.6% males) in the intervention phase and 65 infants in sustenance phase (52.3% males). The mean gestation was 30.4, 30.7 and 30 wk during the baseline, intervention and sustenance phase respectively. PGF decreased from 78.1% to 35% and sustained at 36%. Time to first feed decreased by 6 h and mean age at reaching 180 ml/kg/d of feeds decreased by 2 d and time to regain birth weight decreased by 3 d. Incidence of mortality, NEC, anemia requiring transfusion, PDA and metabolic bone disease did not change significantly during the study.

Conclusions: PGF can be reduced by systematic feeding protocol and by quality improvement methods.

5. Magnesium sulfate as an adjunct to therapeutic hypothermia in the management of term infants with hypoxic ischemic encephalopathy: A randomized controlled trial

Chanchal Kumar1, Bethou Adhisivam1, Zachariah Bobby2, Ballambattu Vishnu Bhat1
Department of 1Neonatology and 2Biochemistry, Jawaharlal Institute of Postgraduate Medical Education & Research, Puducherry; 3Department of Pediatrics and Neonatology, AVMC, Puducherry
Corresponding author: Bethou Adhisivam
Email: adhisivam1975@yahoo.co.uk

Conclusion: A multi-pronged effort focusing on exclusive breastfeeding improved voluntary milk donation in HMB bank. Multiple micro-teams and local networking facilitated the QI initiative.
Background: Among term and late preterm infants, hypoxic ischemic encephalopathy (HIE) contributes to 20% of all neonatal deaths in India. Therapeutic hypothermia is the standard of care in term infants with HIE but has been shown to provide up to 25% neuroprotection in moderate to severe HIE. Additional neuroprotection may be achieved by using concomitant pharmacological neuroprotective agents. The neuroprotective role for the Magnesium sulfate therapy given to at-risk mothers for preterm birth for the preterm fetus is well established now.

Objectives: Primary objective: To compare the composite outcome of neonatal mortality or abnormal neurodevelopmental outcome (1 y of age) among term infants with HIE treated with Magnesium sulfate and therapeutic hypothermia (group A) and therapeutic hypothermia alone (group B).

Secondary objectives were to compare the neonatal mortality, neurodevelopmental disability at 1 y of age, hospital course and adverse effects of magnesium sulfate.

Methods/Design: Parallel group randomized controlled trial.

Results: The baseline characteristics were comparable between the intervention and comparator group. A total of 12 infants died or had abnormal neurodevelopmental outcomes at 1 y of age in the magnesium and therapeutic hypothermia group as compared to 18 infants in the therapeutic hypothermia alone group. However the difference was not statistically significant (p value 0.51; relative risk 0.51; 95% confidence interval 0.20-1.27).

Conclusions: The combination of magnesium sulfate and therapeutic hypothermia did not improve the composite outcome of neonatal mortality and neurodevelopmental outcome at 12 mo of age. The dose of 250 mg/kg/dose once every 24 h for 3 d did not result in the adverse effects like hypotension or respiratory depression requiring assisted ventilation, however, it caused hypermagnesemia in the intervention group.

Conclusions: Deformation imaging is feasible in very preterm neonates with good reproducibility. LV-GLS and RV-GLS within 72 h predict PDA treatment and BPD respectively.

7. Non-invasive bilirubin sensor for continuous monitoring and automatic control of phototherapy for infant jaundice treatment

Abstract: Measurement of bilirubin content in neonates at an early stage is important to prevent any serious illness such as jaundice. Jaundice meter that can determine bilirubin count is widely used as a diagnosis procedure and the treatment procedure includes phototherapy, which uses blue light to break down the bilirubin by isomerization. Both the diagnosing and treatment procedures are manual methods which require external assessment. In order to make both the procedures automatic, the non-invasive bilirubin sensor has been designed which is compact for continuous monitoring of bilirubin values. Based on bilirubin value measured by sensor, light intensity of phototherapy setup can be altered using machine learning and IoT technology. The non-invasive bilirubin sensor follows spectro-photometry principle. A machine learning algorithm is developed in order to provide high speed optimization and control of the overall application. Various aspects like the bilirubin count, severity of fever, saturation of skin pigment, etc. will be used as a predetermined input for the ML algorithm, based on which, the measures for various treating parameters will be controlled. The microprocessor will offer the system to run as a standalone application and aids to update the results to a cloud-based server-client (IoT) system for the hospital to maintain and organize patient records.

8. Cerebroplacental ratio percentile - A predictor of adverse pregnancy outcome

Abstract: To assess the predictive efficacy of Cerebroplacental ratio (CPR) percentile in third trimester to identify fetuses at risk of adverse pregnancy outcome and to compare with the conventional parameters estimated fetal weight, umbilical artery pulsatility index and cerebroplacental ratio (cut-off <1). Aims: To evaluate the predictive efficacy of Cerebroplacental ratio (CPR) percentile in third trimester to identify fetuses at risk of adverse pregnancy outcome and to compare with the conventional parameters estimated fetal weight, umbilical artery pulsatility index and cerebroplacental ratio (cut-off <1).

Methods: This was a retrospective cohort study done between September 2018 and September 2019, at Fetal Medicine Unit, Sri Ramachandra Medical Centre. Following approval from the Ethics Committee, 600 women with a single non-anomalous fetus, delivered within 3 wk of fetal Doppler study in the third trimester were included in the study. The parameters EFW (<5th centile), UA-PI (>95th centile) and CPR (<5th centile) were calculated. Perinatal outcomes assessed were intrapartum CTG abnormalities, operative delivery for fetal distress, preterm delivery, low birth-weight (BW) centiles, and a composite neonatal outcome. Statistical indices calculation and results analysis was done using SPSS software version 16.

Results: CPR (<5th centile) had a sensitivity of 47%. When all parameters were normal, 58 pregnancies had adverse outcomes. CPR percentile values were abnormal in 14 of them (24%). Combination of CPR and EFW had high specificity of 99.8% and positive predictive value of 97.1%.
Conclusions: Comparatively, CPR percentile is a better predictor of adverse outcome and can be affected earlier in fetal hypoxia, than other parameters. The addition of CPR percentile to EFW improves the positive predictive value of the test which can be used to optimize the perinatal outcome without increasing unnecessary interventions.

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9. Effect of hydrocolloid dressing on nasal injury among preterm neonates on nasal continuous positive airway pressure (nCPAP): A randomized controlled trial
Takhelmayum Bideshwori¹, Nishad Plakkal², P Vetriselvi³
¹College of Nursing, JIPMER; ²Department of Neonatology; ³Paediatric C.O.N. JIPMER
Corresponding author: Nishad Plakkal
Email: plakkal@gmail.com

Importance: Nasal continuous positive airway pressure (nCPAP) is widely used in management of respiratory distress. Preterms are at high risk for nasal injury during nCPAP.

Objectives: To assess the effect of hydrocolloid dressing, when compared to petrolatum jelly (Vaseline®) application, on nasal injury among preterm neonates on nCPAP and to identify the association of nasal injury with their clinical characteristics.

Design, setting and participants: This randomized controlled trial was conducted at NICU, JIPMER. Seventy-eight preterm neonates with gestational age 25-36 wk receiving nCPAP >4 h were consecutively enrolled and randomly allocated to treatment (hydrocolloid, n=39) or control group (Vaseline, n=39).

Methods: In group 1, hydrocolloid dressing was cut to a length of 3-4 cm with two holes applied around the nostril before nCPAP was connected. In group 2, vaseline was smeared around the nostril before nCPAP was connected. Assessment was done at baseline and once daily, until 2 wk of age or when nCPAP was discontinued, whichever was earlier. The dressing in group 1 was changed daily; petrolatum was applied during assessment as per standard practice. The skin, nasal septum and nostrils were examined, and findings were recorded, along with a clinical photograph.

Results: Fourteen preterm neonates (hydrocolloid= 5 and control= 9) developed nasal injury. The difference was not statistically significant [In group 1, normal= 34 (87.2%) and mild= 5 (12.8%); In group 2, normal= 30 (76.9%), mild= 7 (17.9%) and moderate= 2 (5.2%)]. No infant in the study had severe injury.

An association between the level of nasal injury and duration of nCPAP (P <0.05) in the hydrocolloid group was noted.

Conclusions: Although not statistically significant, there was a reduction in each level of nasal injury and overall incidence with the use of hydrocolloid dressing.

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10. The impact of time to reach full feeds on mortality and morbidity in preterm NICU babies- A prospective observational study
Diva Durga, Mangalabharathi Sundaram, Prakash Vinayagam, Mohammed Sajid
Department of Neonatology, Institute of Obstetrics and Gynaecology, Chennai
Corresponding author: Mangalabharathi Sundaram
Email: drmangalabharathi@gmail.com

Objectives: To determine the effect of time to reach full feeds (120 ml/kg/d) on mortality and morbidity among preterm neonates and factors influencing the time to reach full feeds.

Methods: This prospective observational study was conducted in a Level III NICU, Department of Neonatology, IOG from July 2019 to January 2020, and included preterms 27-32 wk.

Results: Out of the 259 preterms, 96 babies were started exclusive enteral feeding on day 1 reaching full feeds within 72 h with 98.9% survival, mortality being significantly less (p <0.001). The incidence of culture positive sepsis was less in babies reaching full feeds within 72 h (15.8%) with a significant less usage of antibiotics [median duration of 0 (0, 5) d vs. babies taking > 14 d [43.5%—culture positive sepsis, 21 (15.7, 26) d of iv abx.]. The incidence of PDA (2.3%), IVH (4.4%), ROP (7.3%), BPD (0%), NEC (0%) & inotropic requirement (2.2%) was significant less in the babies reaching full feeds earlier whereas the same being 72%, 84%, 75%, 25%, 25% & 85% respectively for babies reaching full feeds >14 d; the duration of NICU stay & ventilation being significantly shorter in babies reaching full feeds earlier. Doppler abnormality, SGA <3 rd centile, steroid coverage and HIE had no influence on time to reach full feeds.

Conclusions: Early attainment of full enteral feeds reduces the mortality, culture positive sepsis, NEC, PDA, IVH, ROP, BPD, inotropic requirement, duration of ventilation, iv antibiotics and hospitalization.

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11. What are the factors associated with necrotizing enterocolitis in a developing country? A multicenter collaborative study
Gokuldas Punnadan Koroth¹, Nivedita Mondal¹, Sreekumar Nair², Nishad Plakkal³
¹Department of ¹Neonatology and ²Medical Biometrics and Informatics, JIPMER, Puducherry
Corresponding author: Nishad Plakkal
Email: plakkal@gmail.com

Background: Necrotizing enterocolitis (NEC) is a serious morbidity of preterm infants.

Objective: The primary objective was to identify the incidence of NEC in infants <33 wk or with very low birth weight (BW <1500 g).

Design/Methods: Setting: The Indian Neonatal Collaborative (INNC) is a network of neonatal units in India. Design: Retrospective cohort; infants born at <33 wk or BW <1500 g in 2018-2019 were included. Analysis: After descriptive statistics, multivariate logistic regression model was constructed to identify potential predictors. STATA 14 was used for analysis.

Results: Two thousand six hundred thirty two infants from 15 centers were included (54.9% males). The mean gestation was 30.5 wk (IQR 29-32 wk) and mean birth weight was 1296 g. Seventy six infants developed NEC (incidence 2.89%). Among infants with NEC, mean gestational age was 29.4 wk and mean BW was 1078 g. Mortality was 17.1% in infants with NEC, compared to 7.9% in infants without NEC. Among sites, the incidence of NEC varied from 0% to 6.8%. After adjusting for potential confounders in the regression model, antenatal doppler abnormalities (aOR 3.88; 95% CI 2.15-7.01) and neonatal sepsis (aOR 4.54; 95% CI 2.65-7.78) were independently associated with increased odds of NEC, and higher BW was associated with lower odds (aOR 0.23; 95% CI 10.09-0.57).

Conclusions: The incidence of NEC in this cohort of 2632 infants was 2.89%. NEC increased with sepsis, antenatal Doppler abnormalities and lower birth weight. Large inter-center variation in NEC was noted.

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12. Parent-mediated early intervention program for preterm infants in the neonatal ICU- A prospective phase-lag interventional cohort study (Preliminary report)
Jeslin Varghese¹, Hima JB², Samuel Kamalesh Kumar¹, Santhanam Sridhar³
¹Department of ¹Occupational Therapy and ²Neonatology, Christian Medical College, Vellore
Corresponding author: Santhanam Sridhar
Email: santhanamsridhar@gmail.com

Background: Parent-mediated early intervention programs have shown to improve parent-child interaction, parenting behavior and infant...
outcomes such as cognitive, language, gross and fine motor development, behavioral and emotional regulation. Programs that are culturally appropriate, independent of literacy, easily understood and implemented are lacking in our population.

**Objectives:** To develop an Educational-Behavioral program on early intervention for parents of preterm infants admitted in the Neonatal ICU. Also to evaluate the effectiveness of this program in reducing maternal stress, anxiety and improving parent-infant bonding.

**Study design:** Prospective phase lag interventional cohort trial

**Methodology:** This is a preliminary report. Mothers of preterm infants (≤32 wk and birth weight ≤1500 g) with working knowledge of English or Tamil were recruited. A 4 wk pictorial educational behavioral program was developed entitled "Parent Administered Neuro-Developmental Activities (NICU-PANDA)". Mothers attended 4 sessions of 30 min each in addition to standard care. Pre and post tests were done at recruitment and after 6 wk using the State-Trait Anxiety Inventory (STAI), Parental Stress Scale (PSS-NICU) and Postpartum Bonding Questionnaire (PBQ).

**Results:** Twenty-three mothers completed the intervention program. There was a significant reduction in the mean anxiety (p <0.001), stress (p <0.001) and improved postpartum bonding (p <0.001) between the pre and post-test scores using STAI, PSS-NICU and PBQ respectively. The post-test scores were not associated with any maternal or infant demographic variables except length of hospital stay.

**Conclusions:** The Parent-mediated early intervention program which was developed was found effective in reducing anxiety, stress and improving postpartum bonding for the mothers of preterm infants in NICU.

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13. Effect of early sodium supplementation in preterm neonates between 25 and 31 weeks of gestational age on postnatal weight gain: A double blinded randomized controlled trial

Anvesh Amiti, Prakash A, Umamaheswari B, Usha Devi R, Abdhul Gani Department of Neonatology, Sri Ramachandra Institute of Higher Education and Research, Chennai

Corresponding author: Prakash A
Email: drprakash1@gmail.com

**Objectives:** To compare velocity of weight gain (g/kg/d) at 34 wk PMA in neonates born between 25+0 and 30+6 wk of GA with early sodium supplementation vs. placebo.

**Methods:** This double blinded RCT was conducted in a Level III tertiary NICU and included neonates 25+0 to 30+6 wk GA who had reached minimum of 100 ml/kg/d feeds and between 5 and 9 DOL and with serum sodium <145 mmol/L. Neonates with major malformations incompatible with life, gastrointestinal anomalies, NPO and renal insufficiency were excluded. Intervention group received enteral 4 mEq/kg/d of 15% sodium chloride equally distributed in all feeds and control group received 0.45% saline of similar volume. Weekly growth velocities of weight, length and HC were taken.

**Results:** Interim analysis was done for this study. Total 68 neonates were eligible for the study; 4 parents were not given consent, 4 neonates did not reach feed volume 100 ml/kg/d, 3 neonates had sodium >145 and hence were excluded. So, the authors enrolled 57 neonates for the study. Out of them, currently the study is ongoing on 18 neonates. Finally, total 39 neonates (19- intervention, 20- study group) were included for analysis. There was no statistical difference in baseline variables except for mode of delivery. Median weight gain velocity (g/kg/d) was higher in intervention group 12.4 (IQR: 10.42-16.83) compared to control group 8.9 (IQR: 7.21-13.42) and it was statistically significant (p value- 0.01). No difference was found in other secondary outcomes like weekly length and HC velocities, duration of ventilation, BPD, ROP, IVH, and days to reach birth weight.

**Conclusions:** Early sodium supplementation improves short term weight gain at 34 wk of PMA. Larger studies are required to see long term outcomes and adverse effects.

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14. Early versus delayed human milk fortification in very low birth weight infants: A randomized controlled trial

Mohammed Imran, Venugopalan Lakshmi, R Shannugasundaram Department of Neonatology, Dr Mehta's Multispeciality Hospitals, Chetpet, Chennai

Corresponding author: Venugopalan Lakshmi
Email: drlakshmi2008@gmail.com

**Background:** Most neonatal intensive care units (NICUs) use fortified human milk but specifics of timing, composition, and advancement of feeds vary. As per the evidence available, early fortification of human milk improves postnatal growth, improves protein, calorie and mineral intake without any significant issues of NEC and feed intolerance. However, data regarding long term growth and neurodevelopment remains inconclusive.

**Objectives:** To study the efficacy of early vs. delayed human milk fortification in very low birth infants and its effect on anthropometry and morbidities.

**Methods:** Very low birth weight preterm babies (n = 126) were prospectively randomized to early fortification (EF) (beginning at a feeding volume of 50 ml/kg/d) or delayed fortification (at a feeding volume of 100 ml/kg/d). The authors employed a standardized feeding protocol and parental nutrition guidelines for the nutritional management of all study infants.

**Results:** The median duration of TPN was equivalent in the 2 groups (10 vs. 11.5 d; p=0.44). No significant difference was observed in the total number of episodes of feeding intolerance and necrotizing enterocolitis. Median OFC gain velocity (cm/wk) was significantly higher in EF group (0.68 vs. 0.58; p=0.01) especially in extreme preterms. Cumulative protein intake (g/kg) in the first 4 wk of life was higher in the EF group [99.4 (91, 103) vs. 89.0 (84.0, 92.0), P= 0.0001].

**Conclusions:** Early human milk fortification may improve cumulative protein intake in very low birth weight infants without increasing frequencies of adverse events.

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15. Validation of WINROP for prediction of severe retinopathy of prematurity among preterm less than 32 weeks– A diagnostic study

Manikandan Paramasivam, Prakash Vinayagam, Mangalabharathi Sundaram, Mohamed Sajjid Department of Neonatology, JOG, Madras Medical College, Chennai

Corresponding author: Prakash Vinayagam
Email: dr.praky@yahoo.com

**Background:** Poor postnatal weight is a risk factor for ROP. WINROP (Weight, IGF1, Neonatal ROP) algorithm is an online tool which predicts the risk for Severe ROP (Type 1) based on gestational age, birthweight and weekly weight gain.

**Objective:** To validate the diagnostic accuracy of the WINROP (https://winrop.com/) in predicting Type 1 ROP.

**Methods:** Diagnostic study design was conducted among babies <32 wk gestation born between Jan 2019 and Dec 2019 with weekly weight and final ROP status available. Based on weekly weight, algorithm signaled an alarm to indicate high risk for Type 1 ROP. From ROP requiring treatment, sensitivity, specificity, PPV and NPV were calculated.

**Results:** A total of 260 babies were included with a mean gestational age of 30 ± 1.2 wk and mean birth weight of 1450 ± 307 g. Sixty three (24%) developed Type 1 ROP and 24 (9%) developed Type 2 ROP. The median time from birth to alarm was 2 wk (IQR 1-2 wk) and alarm to treatment was 21.5 d (IQR 14.75-31.75). Overall sensitivity of WINROP for Type 1 ROP was 79%, specificity 75%, PPV 50%, NPV 91.9%, LHR (+) was 3.19. Among less than 30 wk, sensitivity was 91% and NPV 91.3%.

**Conclusions:** WINROP is a useful non-invasive tool for screening, particularly in babies less than 30 wk in early identification of Type 1 ROP.

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16. An audit of surfactant: Why are we late? Time to ponder!!
Somya Chaturvedi, V Lakshmi, A Krishnan
Department of Neonatology, Dr Mehta’s Hospital Pvt Ltd, Chetpet, Chennai
Corresponding author: V Lakshmi
Email: drlakshmi2008@gmail.com

Introduction: Surfactant is essential to normal lung function in babies. Policy of early rescue should be standard i.e., within 2 h of birth. It is commonly seen that there is a delay in administering surfactant.

Objective: The authors aimed to identify the reason of delayed dosing and clinical implications of the same by an observational study.

Materials and methods: All babies who received surfactant over a year were included in the study. Babies with congenital anomalies were excluded. Quantitative data was expressed in percentage and central tendency was expressed in median. Mann Whitney test was done for evaluation of difference in outcome. P less than 0.05 was considered significant.

Results: Total 65 neonates received surfactant; 49% received delayed surfactant. Median gestational age for early group was 27 wk and late group was 31 wk respectively. Primary respiratory support was CPAP in 35.5% babies, intubation in 47.6% babies and oxoxygen in 16.9% babies who eventually received surfactant. Mann Whitney test was done to find the difference in duration of respiratory support, which was found to be statistically significant (p=0.045). Main cause of delayed surfactant in inborn was due to persistent / progressing distress on CPAP (87.5% of inborn babies who received late) and in outborns due to delay in transport from referral hospital (67.7%) and no CPAP (32.3%) as initial respiratory support.

Conclusions: Clinicians must be aware of early use of CPAP and early transport to facilitate early surfactant. One must also be aware on use of surfactant in view of persistent or worsening distress and not just FiO2 requirement to give surfactant.

17. Perinatal outcome of antenatally detected fetal intra-abdominal cysts
Sunnatha Perumal, Chitra Andrew
Division of Fetal Medicine, Department of Obstetrics & Gynecology, Sri Ramachandra Institute of Higher Education and Research, Chennai
Corresponding author: Chitra Andrew
Email: chitraandrew@gmail.com

Objective: To analyze the perinatal outcome of antenatally detected fetal intra-abdominal cysts.

Methods: This was a retrospective study of fetuses with intra-abdominal cysts on antenatal scans done between January 2014 and December 2019 at Sri Ramachandra Medical Centre. Data was collected from the ultrasound database. Maternal, fetal, and neonatal characteristics were retrieved from the electronic patient records and through telephonic enquiry.

Results: A total of 39 fetuses were diagnosed with intraabdominal cysts antenatally; mostly in third trimester. Of these, there was one ongoing pregnancy, two lost to follow up, three pregnancy losses and 33 live births. Isolated cysts were seen in 34 (87%) fetuses and five (13%) had associated abnormalities. Cyst regression was observed in utero in two (6%) and postnatally in 11 cases. Postnatal diagnosis was not made in ten cases. There were more girls than boys (30 girls and 4 boys) in this study. Ovarian cysts were diagnosed in 50% of cases with persistent cysts. Most pregnancies (82%) were managed conservatively and 18% underwent surgical management.

Conclusions: Isolated cysts have good outcome. Those with associated abnormalities are likely to have poor prognosis. Cysts are common in girls and are usually ovarian cysts, which can regress in utero or postnatally. Gastrointestinal tract abnormalities are mostly observed in boys and are likely to have good outcome following surgical intervention in the immediate postnatal period. Antenatal detection of intra-abdominal cystic lesion helps to offer appropriate antenatal and postnatal follow up and management.

18. Follow-up rates in a three-year longitudinal study of neurodevelopmental outcomes of a preterm cohort in South India
Lakshmi Venkatesh1, Adhirai Garibaldi1, Roopa Nagarajan1, Binu Ninan2, Udayakumar Narasimhan3, Prakash Boominathan
1Department of Speech, Language and Hearing Sciences, 2Department of Neonatology, 3Department of Pediatric Medicine, Sri Ramachandra Institute of Higher Education and Research, Chennai
Corresponding author: Lakshmi Venkatesh
Email: lakshmiv@sriramachandra.edu.in

Objectives: To understand follow-up rates and reasons for loss to follow-up in a prospective longitudinal follow-up of a preterm cohort enrolled at 12 mo and followed up at 24- and 36-mo of age.

Methods: Children (N=593) born <34 wk GA or between 35-37 wk with significant risk factors, enrolled in a Child Development Unit formed the sampling frame. Families were contacted over the phone for enrollment and follow-up. Field and research assistants conducted developmental screening and assessments respectively at 12-, 24- and 36-mo. Appointments were rescheduled as needed and reasons for missing appointments were documented. Home visits were made for families who consented to participate but were unable to visit the clinic.

Results: Among the 344 children enrolled at 12-mo CA, 293 (85%) and 254 (74%) children completed participation at 24- and 36-mo respectively. Follow-up rate at the clinic was 65% and 39% respectively. The reasons for home-visits and loss to follow-up differed at different timepoints. Families with twins/ triplets requested home visits at enrollment. Subsequent pregnancy of the mother and child going to school/presence of a younger sibling at home were reasons for the inability to visit the clinic at 24- and 36-mo respectively. Timely scheduling, multiple reminders and rescheduling facilitated follow-up. Interim phone follow-ups by the same personnel conducting the assessments were welcomed by the families and increased willingness for continued participation.

Conclusions: The study highlighted challenges reported by caregivers for continued neurodevelopmental follow-up of children. Dedicated manpower and modified protocol for follow-up contributed to increased follow-up rates.

19. Acute kidney injury in neonates in Level 3 NICU– A matched case control study
Maria Joseph, N Chandrakumar, Vanaathi, Shannugam Sundaram
Department of Neonatology, Kanchi Kamakoti Childs Trust Hospital, Chennai
Corresponding author: N Chandrakumar
Email: drchandrakumar@gmail.com

Introduction: AKI is a pervasive problem with variable etiology. Research on AKI in the neonatal population is limited.

Objectives: i) To find out incidence of AKI in NICU ii) To identify risk factors for AKI.

Methods: A retrospective matched case control study was conducted for a 2 y period from January 2018 to January 2020. Neonates with AKI (cases) were compared with gestation-matched infants without AKI admitted within 1 wk (controls). Clinical and investigation data were extracted from medical records. Risk factors were analyzed using multivariate logistic regression.

Results: Total 40 cases and 80 controls were enrolled for the study. Incidence of AKI was 5.6%. Among AKI patients, 33 (82.50%) were males. Mean birth weight (SD) in kilograms of AKI group was 2.56 (0.56) and 2.64 (0.52) among non-AKI group. The incidence of AKI was higher in those who received nephrotoxic drugs. Among 40 who had AKI, 20 (50%) had received one nephrotoxic drug and 17 (42.5%) had received two drugs.
received 2 nephrotoxic drugs ($p < 0.001$). Duration of hospital stay (days) in AKI group was 21.4 (33.26) compared to non-AKI group, 9.66 (6.39), $p=0.0028$. On logistic regression, use of nephrotoxic drug was found to be the single most risk factor with OR 5.27 (95% CI: 3.7-5.5).

**Conclusions:** Male sex, sepsis and nephrotoxic medications are independent risk factors for AKI. Use of nephrotoxic medication is the single most important risk factor for AKI.

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20. Knowledge, attitude and practices in breastfeeding among health care professionals in a tertiary care centre
Ajinkya Wazurkar, Nalini, Neelam Sundara Raghupathy
Department of Pediatrics, AVMCH Puducherry, Vinayaka Mission’s Research Foundation University, Salem
Corresponding author: Nalini
Email: nallu_1234@yahoo.co.in

**Importance:** Mothers should be instructed about baby’s hunger cues, proper positioning and attachment, feeding frequency and counselling regarding problems faced during breastfeeding. Health care professionals can play an important role in this aspect.

**Objective:** To assess knowledge attitude and practices of health care professionals in breastfeeding through a pre-validated questionnaire in AVMCH, Puducherry.

**Methods:** Pre validated open ended questionnaire was given to all the participants comprising faculty, postgraduates, staff nurses, interns, final year MBBS and nursing students.

**Results:** Out of 149 participants, mean knowledge score was highest among faculties which was 77.55% (range 64.28 to 92.85%) and mean practice score was 78.57% (57.14 to 100%) and lowest among BSC final year nursing students where mean knowledge score was 30.95% (14.28 to 50%) and mean practice score was 33.01% (7.14 to 60.71%). There was a statistical difference ($p$ value <0.005) between combined knowledge and practice scores of interns, final year MBBS and nursing students.

Participants were having lack of knowledge especially about contraindication of breastfeeding among nursing final year students (16.66% score), staff nurses (22.72%) and MBBS students (30.72%). Attitude had been assessed by Likert scale, where faculty and postgraduates were having good attitude regarding all questions asked, whereas among other participants some lack of attitude was observed.

**Conclusions:** In this study, gaps in knowledge and practices among health care workers was identified. In professional students it is evident that there should be improvement in knowledge through proper teaching and they should be taught skills for practices, for example, proper positioning and attachment for breastfeeding. Counselling efforts were lacking.

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21. Effect of antenatal corticosteroids (ACS) in neonatal mortality and morbidity in preterm 24-34 weeks small for gestational age (SGA) infants when compared to non-SGA infants: A retrospective single centre cohort study
P Ajai Kumar, Mangalabharathi Sundaram, Prakash Vinayagam
Department of Neonatology, Institute of Obstetrics and Gynecology, Madras Medical College, Chennai
Corresponding author: Mangalabharathi Sundaram
Email: drmangalabharathi@gmail.com

**Introduction:** Maternal antenatal corticosteroid (ACS) administration in preterm labor reduces the incidence of neonatal respiratory distress syndrome (RDS) and neonatal mortality. ACS usage is the most effective intervention for these risks associated with preterm birth but current recommendations for ACS use do not differentiate between SGA and non-SGA fetuses.

**Objectives:** To analyze neonatal outcomes in SGA and non-SGA preterm infants with ACS usage.

**Methods:** A retrospective database analysis was performed for preterm infants (24-34 completed wk) born in July – September 2019. Clinical details, weight for gestational age, mortality and major adverse events were noted. Analysis was done with chi square, Fischer’s and t-test.

**Results:** One hundred ninety six preterm infants were included in the study. There were 157 non-SGA infants and 39 SGA infants, with ACS usage of 118 and 34 respectively. There was no difference in mortality between SGA and non-SGA with ACS usage (OR 0.5786, 95%CI 0.2650 to 1.2631 $p=0.1684$) There were no significant differences in incidence of RDS (OR 0.9514, 95%CI 0.42 to 2.11), NEC, PDA, ROP and IVH.

**Conclusions:** Usage of ACS in SGA fetuses at risk of preterm delivery does not lead to worse perinatal outcome.

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