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Abstracts

Selected Abstracts of the 2nd International Workshop "Intensive Care of the Newborn"

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Resuscitation

ABS 1

DOES DELAYED CORD CLAMPING (DCC) AFFECT UMBILICAL CORD pH IN PRETERM INFANTS?

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INTRODUCTION

It should be recognized that the currently used cord blood gas values and cutoffs were derived from samples obtained after immediate cord clamping. However, in the last decade, deferring umbilical cord clamping for a variable duration after birth has been commonly practiced. The benefits of deferred cord clamping (DCC) have been demonstrated in several studies. A *Cochrane* review by Rabe et al. showed that infants who received placental transfusion (by deferring cord clamping or cord milking) had higher blood volume and hematocrit levels; less need for red blood cell transfusion; higher mean arterial blood pressure after birth and at 4 hours of age; less use of inotropes for low blood pressure; less intraventricular hemorrhage (IVH); and less necrotizing enterocolitis (NEC). Studies showed conflicting results regarding the impact of DCC on umbilical cord pH.

OBJECTIVES

To determine if there is equivalence (difference < |0.03|) in umbilical cord pH in preterm infants 26-32 weeks gestational age (GA) who received DCC for ≥ 45 seconds (s) and those who did not.

METHODS

Quasi-experimental, retrospective, pre-post intervention study of inborn preterm infants 26-32 weeks GA before (January 2012-June 2013) and after (May 2014-October 2015) implementation of DCC guidelines in our tertiary center. Monochorionic twins, higher order multiples, infants with birth weight < 3rd percentile, and those who received palliative care were excluded. Prenatal and birth characteristics were extracted from Alberta Perinatal Health Program and our local databases. Cord pH was obtained from electronic medical records.

RESULTS

732 inborn infants were eligible and cord pH was available in 584. In addition, 81 infants were excluded as described above. Among 259 of 503 infants in the post DCC period, 167 received DCC for ≥ 45 s. **Tab. 1** shows a comparison between the groups. In a post hoc analysis, we compared cord pH of infants who received DCC for ≥ 45 s to those in the pre DCC period. DCC for ≥ 45 s was not associated with lower umbilical cord pH, despite a higher prevalence of male sex and maternal diabetes, and less use of antenatal steroids in the post DCC period. No statistically significant difference was found; mean difference -0.002 and 95% CI (-0.024 to 0.021).

CONCLUSIONS

Regarding the impact of DCC on umbilical cord pH, DCC for ≥ 45 s was not associated with lower umbilical cord pH.

Table 1 (ABS 1). Comparison between the two groups (pre deferred cord clamping [DCC] group and post DCC group).

Baseline characteristics	Pre DCC (n = 244)	Post DCC (n = 259)
GA (weeks), mean (SD)	29.6 (1.8)	29.6 (1.8)
Birth weight (g), mean (SD)	1,371 (390)	1,367 (400)
Male sex, n (%)*	146 (60)	132 (51)
Gestational or pre-existing diabetes, n (%)*	26 (11)	47 (18)
Maternal hypertension, n (%)	55 (23)	53 (21)
Antepartum hemorrhage, n (%)	77 (32)	73 (28)
Antenatal steroids, n (%)**	233 (96)	219 (85)
Antenatal $MgSO_4$, n (%)**	6 (3)	67 (26)
Chorioamnionitis, n (%)	20 (8)	17 (7)
Caesarean birth, n (%)	144 (59)	138 (53)
Apgar score at 1 min, median (IQR)	6 (4-7)	6 (4-7)
Apgar score at 5 min, median (IQR)	8 (7-9)	8 (7-9)
SNAP II score, median (IQR)*	10 (5-17)	9 (0-14)

DCC: deferred cord clamping; GA: gestational age.

ABS 2

SNAP-PE SCORE. MORBIDITY AND MORTALITY INDEX IN NICUs

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INTRODUCTION

Several scores, including SNAP-PE (Score for Neonatal Acute Physiology – Perinatal Extension), have been established and used in epidemiological and clinical studies for evaluation of neonatal morbidity and mortality in NICUs. The aim of this study was to assess SNAP-PE score as an index of morbidity and mortality in neonates with hypoxia, asphyxia, and suspected sepsis or septicemia in our hospital NICU.

METHODS

This study included 169 neonates who were hospitalized in the NICU with hypoxia, asphyxia, suspected sepsis or septicemia during a period of 2 years. Neonates were divided into 4 groups; A) 5 neonates with asphyxia; B) 59 neonates with hypoxia; C) 45 neonates with septicemia; D) 60 neonates with suspected sepsis. SNAP-PE score, defined through SFAR electronic system, was performed during the first 24 hours of life in groups A and B, and upon clinical aggravation in groups C and D.

RESULTS

When comparing all 4 groups, SNAP-PE score was statistically significantly higher ($p = 0.000$) in groups A and C.

The difference between groups A and C was not statistically significant ($p = 0.552$).

SNAP-PE score was significantly correlated with; a) the time to achieve full enteral feeding in neonates ($r = 0.613$, $p = 0.000$) and b) the duration of hospitalization in NICU ($r = 0.674$, $p = 0.000$).

Finally, among the study neonates, the highest SNAP-PE scores were recorded in 3 neonates with asphyxia and 3 with septicemia, all of whom eventually died.

CONCLUSIONS

Our study results, in accordance with international published literature findings, show that SNAP-PE score is a reliable index for evaluation of morbidity and mortality of neonates hospitalized in NICUs. Furthermore, SNAP-PE score could be used not only for neonates with asphyxia, but also for those with septicemia.

ABS 3

EARLY PERINATAL INTERVENTIONS IMPROVES NEONATAL OUTCOMES

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INTRODUCTION

Evidence based interventions (EBI) around the time of birth of preterm infants has an impact on their long term outcome. However, not all eligible patients receive every relevant EBI.

To improve clinical outcomes, it is important to know the proportion of patients who fail to receive EBI and the factors preventing their reliable delivery.

OBJECTIVE

To evaluate the effectiveness of existing systems of service provision in delivering EBI reliably around the time of birth of infants born before 28 weeks. This was a retrospective study of such infants born and admitted to the tertiary neonatal unit in 2016.

The EBI studied are:

1. antenatal steroids (ANS);
2. antenatal magnesium sulphate (AMS);
3. delayed cord clamping (DCC) (> 30 s);
4. thermoregulation at admission;
5. initial stabilisation time;
6. early breast milk feeds.

The outcomes studied are:

a. short term:
   1. severe RDS (requiring intubation and surfactant administration);
   2. IVH;
   3. mortality.
b. medium term:
   1. CLD;
   2. ROP requiring laser treatment;
   3. PVL.

RESULTS

14 babies included in the study:

- median GA: 26 weeks;
- median BW: 860 g.

Process reliability:

1. ANS: 100% of mothers received at least one dose of ANS;
2. AMS: 50% of mothers received AMS;
3. DCC: it was carried out in 14.3% of deliveries;
4. thermoregulation at admission: 71.4% babies were normothermic;

Table 1 (ABS 3). Impact of receiving or not receiving at least 4 evidence based interventions (EBI).

	At least 4 EBI	< 4 EBI
Number of patients	7	7
Gestational age (weeks)	26^{+4}	24^{+4}
Birth weight (grams)	899	846
M:F	3:4	2:5
Died	0	4/7 (57.1%)
Severe RDS	6/7 (85.7%)	7/7 (100%)
IVH	0	2/7 (28.6%)
ROP requiring treatment	1/7 (14.2%)	0
Chronic lung disease	5/7 (71.4%)	7/7 (100%)
PVL	0	0

EBI: evidence based interventions.

5. initial stabilisation time: 57.1% babies were stabilised within 2 hours;
6. early breast milk feeds: 64.3% babies received breast milk by day 2 of life.

All 6 EBI received by 1/14 (7.1%) infants.

Outcomes: impact of receiving or not receiving at least 4 EBI is presented in **Tab. 1**.

CONCLUSIONS

The findings from the study suggest that the delivery of EBI is sub-optimal. The infants who received more EBI appear to have reduced mortality and morbidity. There is potential to improve clinical outcomes of these infants by identifying and developing interventions to overcome the factors preventing the reliable delivery of EBI.

ABS 4

DILATED CARDIOMYOPATHY AND VITAMIN D DEFICIENCY: CASE REPORT IN A PRETERM INFANT

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INTRODUCTION

The correlation between severe heart failure and hypocalcemia in D hypovitaminosis has been described in literature sporadically, with a total reversibility of the disease even in heart impairment with poor prognosis.

CASE REPORT

Amir, a Moroccan boy, was born at 30 weeks gestation via caesarian section because of intrauterine growth restriction and anhydramnios, with a birth weight of 900 g. He was admitted to our NICU for his prematurity and respiratory distress with acidosis, requiring intubation and mechanical ventilation. An echocardiography, performed on day one after birth, showed severe bi-atrial dilatation, diastolic impairment, tricuspid and mitral valves incompetence with a bidirectional shunt through both ductus arteriosus and foramen ovale. He needed diuretic therapy and inotropic support to solve a severe anuria also induced by moderate renal insufficiency, a fact that led us to suspect an idiopathic dilated cardiomyopathy. Since serum calcium on day three was 7.5 mg/dl (ionized calcium: 0.84 mg/dl), with normal level of phosphorous and alkaline phosphatase, the calcium intake via parenteral nutrition was increased from 50 to 70 mg/kg/day. Serum concentration of 25-hydroxyvitamin D was detected with a value of 6 ng/ml; given that normal values in pediatric age are > 30 ng/ml, while serum level < 10 ng/ml indicates a severe deficit, we then doubled oral vitamin D supply, from 400 UI/day to 800 UI/day, obtaining in few days an increase of serum calcium reaching normal level (total serum calcium: 10 mg/dl; ionized calcium: 1.48 mg/dl). Additionally, cardiac abnormality was resolved within 3 weeks with beta-blocker therapy.

CONCLUSIONS

This case report underlines the importance of giving special attention to calcium/phosphorous metabolism in newborn cohorts at high risk of D hypovitaminosis, induced for example by ethnic/racial reasons or maternal dietary behaviour.

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ABS 5

SURVEY ON PERINATAL PALLIATIVE CARE ACROSS ITALY: PRELIMINARY RESULTS

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INTRODUCTION

Over time, advances in neonatal care have led to a gradual lowering in the gestational limits of survivability and increased the viability of neonates with a life-limiting condition. These advances have also increased the risk of disproportion between therapeutic ends and means, with a consequent emerging of a new population, eligible for perinatal palliative care (PPC). In Italy, national guideline lacks recommendations on organization, content and preferred decision-making of how to perform PPC and very little data is available on the application of PPC in Italian Neonatal Intensive Care Units (NICUs). The aim of this study was to explore current PPC practices across Italy through a questionnaire.

MATERIAL AND METHODS

We sent an online nationwide 16-questions survey amongst neonatologists in all Italian level II/III perinatal care centers (n = 87). The survey regarded PPC and focused on the domains of organization, content and decision-making in current practice.

RESULTS

Forty-nine surveys were returned out of 87 eligible NICUs (response rate 56%). PPC guidelines are present in 25% of the centers, even if 82% of respondents stated that in their hospital there are psychologists, palliative care pediatricians and bioethicists and 68% of them answered that there is the possibility of an advice by the Bioethics Committee. Less than 1/3 of the NICUs organized a formal internal course on PPC in the three previous years. A prenatal counselling service for high risk pregnancies is offered almost in all centers (93%). Seventy-five percent of these meetings were conducted by a gynecologist and a neonatologist together. When the team chose to offer PPC to a patient, complete documentation in the medical records was reported in 39% of the centers. Reasons for incomplete documentation were lack of education/training in end-of-life decision-making (47%) and fear for legal consequences (35%).

CONCLUSIONS

Our preliminary results confirmed significant variation in PPC application and verified that many institutions do not formally address PPC across Italy. Further studies on both barriers to perform adequate PPC, as well as on Italian outcome statistics and parents' opinions, are needed in order to develop a national framework.

ABS 6

PLASMA ERYTHROPOIETIN AND FETO-NEONATAL ASPHYXIA IN TERM AND PRE-TERM NEWBORNS

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INTRODUCTION

The amount of erythropoietin (EPO) in plasma, the bone marrow growth factor specific for the erythrocyte lineage, increases if the concentration of peripheral oxygen decreases; since the molecule does not overcome the placental barrier, its dosed levels on venous blood, taken at birth from the umbilical cord, could be directly related to the fetal and perinatal hypoxic-ischemic injury. To verify whether this assumption can be valid not only in term newborns but also in preterm newborns, we performed this dosage in two groups of subjects, respectively with mild or severe asphyxiation, and we compared it to other perinatal variables.

MATERIALS AND METHODS

The subjects were divided as follows: 12 newborns with mild asphyxia (group 1) and 20 with severe asphyxia (group 2); a control group consisting of 6 healthy newborns, both term and preterm, was also considered (group 3). Venous blood sampling for EPO was performed at birth from the umbilical cord and a quantitative serum determination was performed by ELISA method.

RESULTS

The mean EPO values didn't differ much in the three groups. However, preterm newborns presented a wide standard deviation, decreasing at the increase of the gestational age. EPO values were proportionately higher in subjects with severe asphyxia: in this group of patients 7 out of 20 newborns showed values above the confidence interval of the literature. In the group of subjects with mild asphyxia only 1 subject out of 12 showed high values of EPO. In the control group no subjects presented values of EPO higher than normal. No significant differences were noted between preterm and term infants.

CONCLUSIONS

EPO, as well as other bone marrow growth factors, seems to be stimulated in a very early age for hypoxic-ischemic stimulation both during fetal life and in the perinatal period. From our data it has

emerged that also preterm infants have an ability to respond to hypoxic-ischemic insults similar to term newborns.

ABS 7

A CHALLENGING CASE OF CONGENITAL INFANTILE FIBROSARCOMA

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INTRODUCTION

Congenital Infantile Fibrosarcoma (CIF) is a rare soft-tissue tumor characterised by local aggressiveness but with high survival rates. Conservative surgery is the mainstay of treatment, but in some cases chemotherapy is necessary due to advanced disease, tumor size and localization.

CASE REPORT

We present a case of CIF of the forearm that required a mutilating surgery to prevent death by hemorrhagic shock. A 32^{+5}-week, male neonate was born via emergent cesarean section due to fetal anemia and altered cardiotocography. Pregnancy was complicated by prenatal diagnosis of a vascularized, progressively increasing neoformation of the left forearm. At birth the neonate was hypotonic, hyporeactive, affected by bradypnea, HR < 100. The neoformation, occupying the entire forearm, was bleeding and covered by ecchymotic and ulcerated skin. Initially, the patient required nasal continuous positive airway pressure. At admission to the neonatal care unit the patient quickly developed a hypovolemic shock with anemization (10% hematocrit). Moreover, a multi-organ failure was established with increase of liver values and acute kidney failure. He was intubated and umbilical catheters were placed. He was supported with transfusions of packed red blood cell (PRBC), fresh frozen plasma (FFP) and platelets and inotropic therapy. A continuous bicarbonate infusion was initiated due to persistent acidosis. The pediatric surgeon tried to stop the mass bleeding using advanced hemostatic medications and by affixing pledgeted sutures. Finally, to stop the bleeding, it was necessary to place a tourniquet proximal to the lesion. At the same time a biopsy sample was taken. This made it possible to achieve hemodynamic and hematological stabilization: any attempt to remove the tourniquet was associated with rapid impairment of vital parameters. Histological analysis was diagnostic for CIF and molecular analysis highlighted the presence of the transcript ETV6-NTRK3, originated from the translocation t(12;15). The case was shared with oncologists, pediatric surgeons and orthopedic surgeons. Chemotherapy would have necessitated the removal of the tourniquet and would not have determined the rescue of the forearm, already very compromised. Because of this, the patient was taken to the operating room, on the 2nd day of life, for amputation of left upper limb. Histopathological examination confirmed the complete removal of the neoplasia with free section margins. A CT of the chest excluded metastatic lesions. After the removal of the mass the patient's conditions progressively improved and he was discharged two months after surgery with an oncologic follow-up program.

CONCLUSIONS

CIF has a favorable prognosis and complete surgical excision is curative. However, dimension and localization of the mass, age and comorbidity of the patient can make this neoplasm life-threatening so that intensive care and a mutilating surgery could be necessary.

ABS 8

BIRTH ASPHYXIA IN LIMITED-RESOURCE SETTINGS: ASSOCIATED FACTORS AND OUTCOMES IN RURAL AFGHANISTAN

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INTRODUCTION

Perinatal asphyxia in an unselected obstetric population is a difficult challenge in limited-resource settings (LRS). The Anabah Maternity Centre, run by the NGO EMERGENCY in rural Afghanistan, managed 7,345 deliveries in 2017.

Apgar Score < 7 at 5' (LAS) is the chosen broad criterion for admission in our NICU: to adopt a wider range than the one indicated by international guidelines is a method of keeping high surveillance on neonates in need of resuscitation in the delivery room.

MATERIALS AND METHODS

We retrospectively collected the data of 2,776 consecutive live births (excluding fresh stillbirths) from singleton pregnancies in our maternity hospital in Panjshir, Afghanistan, from July to November 2017. 78 were admitted for LAS. We excluded newborns with major malformations or birth weight < 1,000 g (67 remaining). We evaluated the OR for the outcome "neonatal death" compared to possible predictive factors for a bad outcome.

RESULTS

Neonatal Mortality Rate (NMR) for LAS as the main cause of death was 4.2%. Among babies admitted for LAS, mortality rate was 17.9%. Obstetric factors associated with bad outcome include: advanced active labour (OR 5.7) at admission; modes of delivery different from spontaneous vaginal delivery (vacuum OR 3.2; caesarean section OR 1.3). Breech presentation and obstetric catastrophes are not worsening the outcome (OR 0.4 and 0.64, respectively). The LAS neonates with birth weight < 2,500 g have OR 4 compared to neonates with birth weight ≥ 2,500; excluding VLBW, the association remains (OR 1.9). In relation to Apgar Score at 5', the risk for death appears to be reduced by 50% when Apgar Score at 5' is 5 or greater.

CONCLUSIONS

Birth asphyxia is a perinatal complication difficult to foresee and manage in LRS. To admit all the neonates with Apgar Score < 7 at 5' has been a cautious strategy in such environment. Even if the sample size is too small to come to consistent conclusions, we observe that the impact of well-known risk factors for perinatal asphyxia (i.e.: vaginal breech deliveries, obstetrical catastrophes) on neonatal outcomes (excluded fresh stillbirths) is minimal: this contributes to reinforce the concept that a proper neonatal resuscitation is the most cost effective intervention to reduce neonatal mortality and morbidity in LRS. In a maternity hospital with bed-occupancy rate of 110% (data 2017) physiologic mothers and neonates can be discharged within 24 hours from birth: it is crucial, in order to properly manage mothers and neonates, to investigate predictive factors and cost-effective diagnostic tools for good and bad outcomes.

High-tech monitoring

ABS 9

NEONATAL HEMORRHAGE FOLLOWING MATERNAL LOW MOLECULAR WEIGHT HEPARIN (LMWH) ADMINISTRATION

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INTRODUCTION

Pregnancy represents an established prothrombotic state. Low molecular weight heparin (LMWH) is widely used during pregnancy for thromboembolic disease prevention or treatment. As per the international published literature, LMWH does not cross the placenta, and is therefore considered safe for the fetus and neonate. Naturally, data from clinical trials in pregnant women are limited principally to maximum therapeutic drug dose and preterm labor cases. In preclinical models, change of fetal coagulation state has been found following maternal administration of the drug; however, drug transfer through placenta has not been confirmed. Additionally, the case of a preterm newborn with subdural hematoma, which was prenatally diagnosed and attributed to maternal use of LMWH, has been published. We present the case of a preterm neonate with severe hemorrhagic diathesis following prenatal maternal LMWH administration.

CASE REPORT

A female neonate was born to a 42-year-old, gravida 3, woman at the 30th week of gestation, weighing 1,770 g. Caesarean section (CS) was performed due to suspected maternal pneumonic embolism. For the same reason, enoxaparin (8,000 IU) had been administered to the mother 8 hours prior to CS. At birth, the newborn was resuscitated and intubated. Within the first postnatal hour, the neonate presented pulmonary hemorrhage as well as mass umbilical cord bleeding during umbilical vascular catheterization. The newborn had received 1 mg of vitamin K (i.m.) immediately after birth, as per usual practice. Laboratory findings included: Hb = 15.7

g/dl, PLT = 219 K/μl, PT = 18 sec, APTT = 45.2 sec, INR = 1.48, fibrinogen = 165 mg/dl. Indicators of infection were negative. Thromboelastometry (TEM) was also performed: Extem (all parameters values were within normal limits) and Intem (CT 343 sec, CFT 76 sec, MCF 62 mm, A10 53 mm, α-angle 75°). Due to history of maternal heparin administration and prolonged Intem CT, Heptem was also conducted: CT 206 sec, CFT 82 sec, MCF 61 mm, A10 56 mm, α-angle 73°. These findings are consistent with an effect of heparin on fetal coagulation mechanism. Three FFP units were administered within 24 hours for the management of hemorrhage. Cranial U/S during the 2nd postnatal hour revealed intracranial hemorrhage grade 1. The neonate remained in critical state during the first 24 hours of life and died on the 2nd day of life due to cardiopulmonary insufficiency.

CONCLUSIONS

TEM results combined with the fact that the newborn had not received any anticoagulants possibly attribute neonatal hemorrhage to heparin which was prenatally administered to the mother. More studies are necessary to clarify safety of LMWH during pregnancy and especially in case of preterm labor. Some questions still remain unanswered: does LMWH cross the placenta or not, in which cases and in what dose.

ABS 10

NEONATAL/INFANTILE PINOCYTOSIS. AN UNUSUAL CASE OF HAEMOLYTIC ANEMIA

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INTRODUCTION

Neonatal pinocytosis is a rare cause of neonatal haemolytic anemia (9.4% of unexplained haemolytic anemia), more common among males (2/1). The etiology of infantile pinocytosis remains unknown. However, the underlying cause could be an extra blood factor that is yet to be identified. Affected newborns present with early jaundice without splenomegaly and transient hemolytic anemia, which peak at 3-4 weeks of life and resolve by the age of 4-6 months. Treatment is symptomatic and supportive. Prognosis is excellent in most cases. The disease is characterized by the a transient haemolytic anemia and detection of increased number of piknocytes in the peripheral blood smear. Piknocytes are erythrocytes with an irregular shape, densely stained with several spiny projections. The diagnosis is based on their finding in peripheral blood smear at > 6-23% after excluding the most common causes of haemolytic anemia. It is noteworthy that the presence of piknocytes in peripheral blood of term and preterm neonates in the first week of life, at rates of 0.3-1.9% and 0.3-5.6% respectively, is a normal finding. We present the case of a newborn with severe anemia and pinocytosis.

CASE REPORT

A male, full-term neonate, weighing 2,820 g, was brought to our unit for paleness and jaundice, at 18 days of age. Upon clinical examination we noticed jaundice, paleness, absence of hepatosplenomegaly and poor weight gain (formula fed). The hematologic tests showed: Hgb 8.5 mg/dl, Hct 24.4%, reticulocytes count 1.76%, bilirubin (total/direct) 8.5/2.4 mg/dl, normal hepatic and thyroid function. Sepsis related indicators were negative. There was no blood group or Rh incompatibility, direct Coombs was negative and G6PD activity normal. On the fourth day of hospitalization: Hgb 5.6 mg/dl, Hct 16.3%, reticulocytes count 4.66%, bilirubin (total/direct) 5.5/1.3 mg/dl. Small-sized, dense, dysmorphic erythrocytes (piknocytes) in the peripheral blood smear were countered > 10%. The neonate was transfused with RBCs and Hgb raised up to 11.2 mg/dl, Hct 34.3%. The neonate was discharged with iron and folate. On follow-up examination at 6 months of age, the infant was free of symptoms.

CONCLUSIONS

Neonatal pinocytosis should be added to the differential diagnosis of neonatal unexplained haemolytic anemia, especially in those cases where the latter is not associated with splenomegaly or infection. A high level of suspicion remains the only way to confirm this diagnosis. Routine peripheral blood smear review in all cases of haemolytic jaundice/anemia is warranted.

ABS 11

THROMBOCYTOSIS IN NEONATES WITH NEONATAL ABSTINENCE SYNDROME THAT WERE HOSPITALIZED AT THE NICU OF GENERAL HOSPITAL OF NIKAIA

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INTRODUCTION

Primary (essential) thrombocytosis in the neonatal period is extremely rare. In most cases high platelet counts are the result of secondary (reactive) thrombocytosis in the neonatal population, but only few studies have focused on its risk factors. Maternal drug abuse has been reported to be one cause of secondary thrombocytosis in infants. It can be due to opioids withdrawal and occurs a few days after delivery. The etiology is unknown and it is eradicated gradually without any complication. The aim of this study was to record the frequency of thrombocytosis in neonates with neonatal abstinence syndrome.

MATERIALS AND METHODS

In a retrospective study we traced and recorded all the data from the clinical examination and routine laboratory hematological tests of 26 neonates, which were born to addict mothers and were admitted to our neonatal intensive care unit (NICU) over a 6-year period (2010-2015).

RESULTS

All 26 neonates presented with symptoms of neonatal abstinence syndrome (NAS) and were provided with appropriate pharmacological treatment and supportive care. During their stay at the NICU, cell blood counts were carried out and revealed hemoglobin and WBC count within normal range. However, secondary thrombocytosis was detected in all 26 neonates: 17 out of 26 neonates (65%) presented mild thrombocytosis (PLTs 500,000-700,000/μl), while 9 neonates (35%) presented medium thrombocytosis (PLTs 700,000-900,000/μl). No one neonate of the study group was found with PLT count of more than 1,000,000/μl. Thrombocytosis appeared after the first week of life (mean day of appearance = 16 days, SD ± 7.5) and subsided by the 4th month of age on average. No thrombotic and/or hemorrhagic complications were observed. There were also no pathological findings in the cranial ultrasound performed in all 26 neonates.

CONCLUSIONS

This study revealed a relation between maternal drug abuse – that resulted in neonatal abstinence syndrome – and the presence of secondary thrombocytosis which is likely due to the elevated production of megakaryocytes following the stimulation of the bone marrow by toxic substances (such as narcotics). This disorder seems to be benign, transient and self-limited, yet it calls for observation. Long-term follow-up of these neonates would be of substantial help to better estimate their situation.

ABS 12

REPEATED, BED-SIDE, NON-INVASIVE RESPIRATORY MECHANICS ASSESSMENT BY FORCED OSCILLATION TECHNIQUE IN SPONTANEOUSLY BREATHING PRETERM INFANTS DURING THE FIRST DAY OF LIFE

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INTRODUCTION

Preterm birth is often complicated by respiratory instability, whose clinical presentation and degree of severity may show a wide inter-subject variety. Early, bed-side evaluation of respiratory function may provide useful information for timely tailoring the respiratory management. The Forced Oscillation Technique (FOT) offers the opportunity to evaluate respiratory mechanics in uncooperative subjects and has been already applied in mechanically ventilated patients [1]. The aim of the current study was to assess the feasibility of non-invasive evaluation of lung mechanics by mean of FOT over the first 24 h of life in spontaneously breathing preterm infants.

MATERIAL AND METHODS

Infants were eligible for the study if they were born between 27^{+0} and 34^{+6} weeks. They were excluded in case of need of intubation for cardiopulmonary resuscitation; major congenital malformations; perinatal hypoxic-ischaemic events. A sinusoidal oscillatory pressure at 10 Hz was superimposed to the nasal CPAP at 5 cmH_2O by mean of a modified Fabian HFO ventilator (Acutronic Medical Systems AG, CH) for 3 min after applying CPAP at 10 cmH_2O for 30 s to normalize lung volume history. Measurements were repeated at 2, 6 and 24 h of life. A nasal mask was used as an interface and

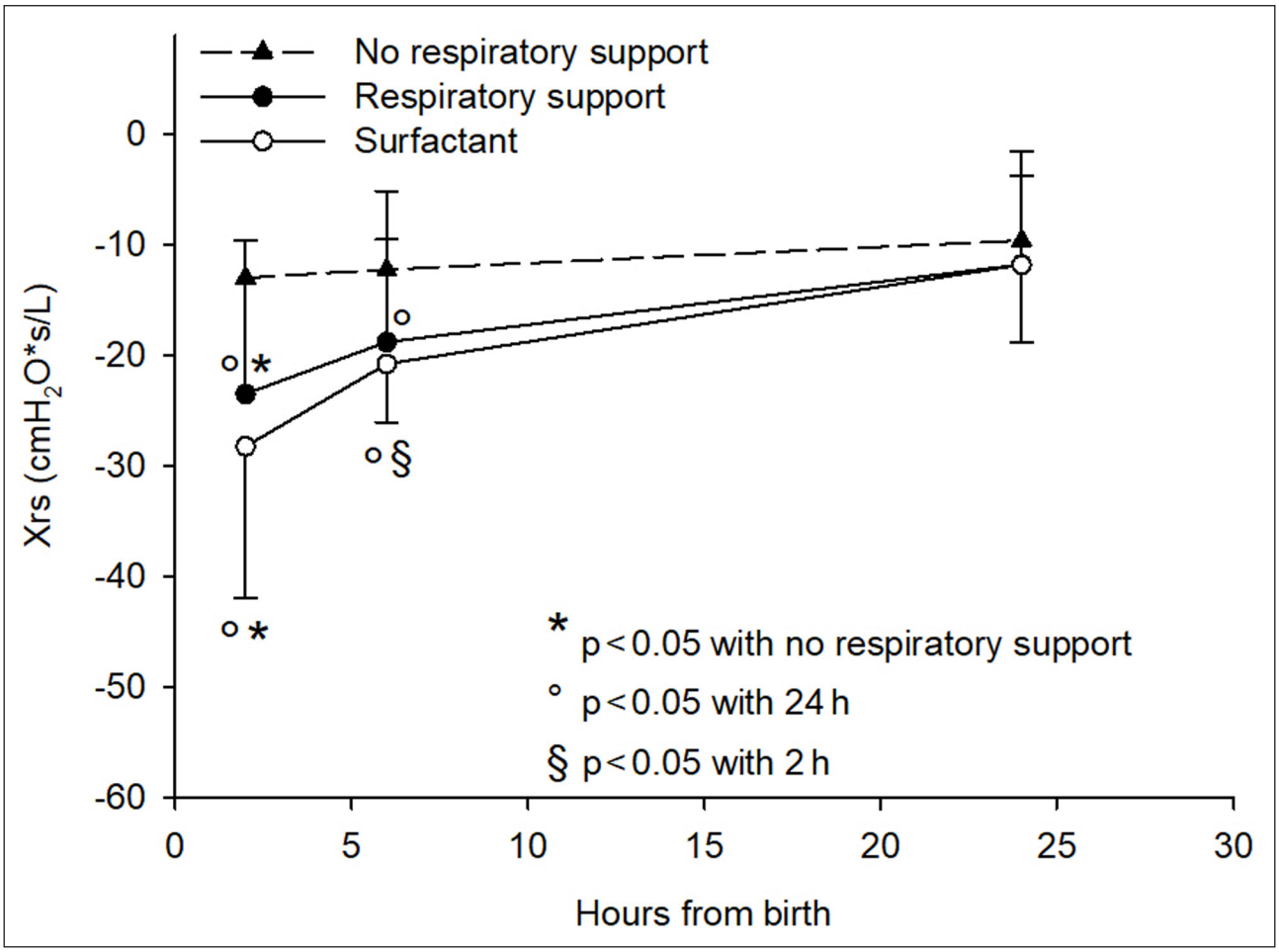

Figure 1 (ABS 12). Mean respiratory reactance (Xrs) over time in the 3 groups.

held in place by the attending physician during the recording. FiO_2 was adjusted as needed to a target SpO_2 of 89-94%. Respiratory reactance (Xrs) was calculated from flow and pressure tracings.

RESULTS

34 infants were studied. All of them well tolerated the FOT measurements. According to the severity of the respiratory distress, we identified 3 groups: group 1, no need of respiratory support (N = 7; gestational age [GA], mean ± SD, 32.83 ± 0.66 weeks; birth weight [BW], 2,015 ± 302 g); group 2, requiring non-invasive respiratory support by nasal CPAP or bilevel nasal CPAP (N = 18; GA, mean ± SD, 31.42 ± 1.69 weeks; BW, 1,525 ± 414 g); group 3, requiring endotracheal surfactant by INSURE technique, according to Sweet et al. [2] (N = 9; GA, mean ± SD, 31.35 ± 1.57 weeks; BW, 1,496 ± 245 g). **Fig. 1** shows mean Xrs over time in the 3 groups. Mean Xrs at 2 h of life was significantly higher in group 1 compared to group 2 and 3 (2-way ANOVA). Mean Xrs remained stable over time in group 1 whereas a significant improvement in mean Xrs was observed between 2 and 24 h in both group 2 and 3; also, in group 3 there was a significant improvement between 2 and 6 h. Higher inter-group variability of Xrs in group 2 was noticed, with infants requiring a longer duration of respiratory support with trend to lower Xrs.

CONCLUSIONS

A non-invasive, bedside evaluation of respiratory mechanics by FOT in spontaneously breathing preterm infants during CPAP is feasible. The preliminary data of the study suggest that FOT may be of interest to differentiate the severity of respiratory illness, addressing prompt interventions and following the subjects over time.

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ABS 13

NOISE EXPOSURE IN NICU AND DURING NEONATAL TRANSPORT: EFFECTS AND EFFECTIVENESS OF NOISE PROTECTION

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INTRODUCTION

Noise is a hazard, and exposes sick neonates to potential hearing loss, autonomic disturbance and behavioural changes. Safe environmental sound pressure levels (SPL) should not exceed 45 dB (decibel) in neonatal ICUs (NICUs). Noise reduction strategies are not routinely used. This study looked at SPLs in NICU and transport situations with mannequins, and the effects of noise levels on real patients during inter-hospital transfer.

METHODS

For mannequin studies, a 4-channel sound level meter was connected to 3 microphones, measuring simultaneous continuous SPL in decibels-A (dBA) from the patient ear, inside and outside the incubator, and then repeated with noise protective equipment (standard headphone or active noise cancelling [ANC]). Similar methods were used for patient studies, with additional pulse oximetry recording. Data were analysed using specialist software and SPSS® v.24.

RESULTS

Noise levels (dBA) were described as peak SPL (L_{peak}) and total sound energy (L_{eq}). In the NICU mean L_{peak} was 59.5 (at ear), 66.7 (incubator) and 73.8 (outside incubator) and the mean L_{eq} was 44.1 (at ear), 52.8 (incubator) and 58.9 (outside incubator). During transport, mean L_{peak} was 69.4 (at ear), 76.6 (incubator) and 83.1 (outside incubator) and mean L_{eq} was 53.3 (at ear), 61.4 (incubator) and 66.2 (outside incubator). Mean (SD) environmental SPLs were 84.4 (6.9) dBA, 76.1 (8.6) dBA in the incubator and 72.2 (7.7) at the infant ear. 80.8% of external noise was transmitted to the infant ear in the NICU simulation, reducing to 78.1% with headphones and 74.8% with ANC protection. In transport, similar reductions were seen: 87.1% of environmental SPL at the ear, reducing to 72.1% with ANC, but with an unexpected increase when standard headphones were used (p80, which is considered harmful). There was no clinical significant difference in oxygen saturations with SPL > 80. However, heart rate was significantly higher (139 vs. 148, $p < 0.001$).

CONCLUSIONS

SPLs detected at the neonatal ear in the NICU and during transport exceed recommended safe levels. 10% of SPLs recorded exceed 80 Dba, and these episodes were associated with a raised heart rate. Active noise cancelling equipment reduces SPL exposure for neonates during transfer. Further study is required.

ABS 14

NEONATAL EMERGENCY TRANSPORT SERVICE IN VENETO: NEONATAL TRANSPORT INDEX (NTI) AS A QUALITY INDICATOR

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INTRODUCTION

The Women's and Children's Hospital of Verona is the "HUB" Centre in the West area of Veneto Region (Italy). In our Unit we manage approximately 3,800 births per year, while our neonatal emergency transport service carries out about 110 emergency transports yearly. The neonatal transport index (NTI) is an expression of the number of neonates transferred per 100 live births. The index can be used to compare the flow of neonates between facilities in each area. The aim of this study was to evaluate the quality of regionalization of perinatal care in our area by using the NTI.

METHODS

We retrospectively analyzed all emergency transports required by our "SPOKE" centres (#10) during a 3-year period. NTI was calculated for each centre. Data were retrieved from our internal registry and the live births per year were collected from a regional database (Cedap).

RESULTS

From January 2014 to December 2016 a total of 334 neonatal transports were performed by our Service. We observed a slight reduction of the number of transports from II level neonatal units to our centre (66% in 2014 versus 50% in 2016, respectively).

Table 1 (ABS 14). Neonatal Transport Index (NTI) from the "SPOKE" centres to the "HUB" of Verona in the studied period.

Hospital	Level	2014	2015	2016	Mean
1	***	1.58	1.75	1.7	1.67
2	**	0	0.78	0.93	0.57
3	***	0.66	0.25	1.12	0.67
4	***	0.59	0.3	0.79	0.56
5	***	1	0.45	0.41	0.62
6	***	0.76	0.22	0.41	0.46
7	***	0.86	0.6	0.62	0.7
8	***	0.64	0.78	0.7	0.7
9	***	0.12	0	0.3	0.14
10	**	0.41	0.4	1.3	0.7

The mean NTI for the entire period was 0.68. The highest and lowest NTI values were 1.67 and 0.14, respectively (**Tab. 1**).

CONCLUSIONS

The review of our data demonstrated a relatively low NTI. In fact, in a recent publication Bellini et al. suggested that an NTI value within a range of 1-1.5% should be used to plan a regional program of perinatal care [1]. Our low NTI may be related to an adequate distribution of perinatal facilities and well-organized maternal transfer and neonatal transport services in our region. Further prospective studies will have to confirm our hypothesis.

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Oxygen and ventilation

ABS 15

INDUCTION OF NEONATAL ANESTHESIA WITH ROOM AIR VS 80% OXYGEN; AVOIDING A DECREASE IN LUNG COMPLIANCE

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INTRODUCTION

The harm of high levels of oxygen to newborn infants is well known, and increasing evidence indicates that also brief episodes of hyperoxia may have negative effects. During induction of anesthesia a high fraction of inspired oxygen (80-100%) is routinely used. The advantage with such a pre-oxygenation is that the time to hypoxemia is prolonged in the case of a difficult intubation. On the other hand, formation of atelectasis impairs gas exchange and reduces lung compliance thereby increasing the risk of ventilator induced lung injury and hypoxemia. Indeed, induction of anesthesia also has been shown to cause atelectasis in infants (down to 6 months), and is most likely caused by a combination of gas resorption and compression of small airways due to a decrease in muscle tone. We hypothesized that induction of anesthesia with room air may result in less atelectasis formation in newborn infants as well.

MATERIAL AND METHODS

After parental consent, 33 infants (< 44 w post-conceptional age) in need of surgery and without prior need of assisted ventilation or supplemental oxygen, were prospectively enrolled (Study ID: NCT02698020). The infants were randomized to induction of anesthesia with either room air (RA), or 80% oxygen (HIOX). After intubation all infants were ventilated with a PEEP of 5 cm, the RA group stayed on room air while the HIOX group received 40% O_2. Pre-specified oxygen saturation targets dictated when/if supplemental oxygen had to be administered. Dynamic compliance (Cdyn; mL/cmH_2O) measurements were obtained from the anesthesia delivery ventilator (FLOW-I, Maquet, Sweden) at 10-min intervals after intubation.

RESULTS

We obtained complete series of measurements in 29 infants (RA, n = 13; HIOX, n = 16). The two groups were similar in gestational age (34-42 w), mean age (2 d), and birth weight (2,200-5,100 g). In the HIOX group Cdyn decreased significantly during the induction while no such decrease was noted in the RA group (**Tab. 1**). No infant in the RA group required supplemental oxygen.

CONCLUSIONS

Induction of neonatal anesthesia with 80% oxygen results in a decreased compliance indicating formation of atelectasis. In our hands, induction with room air is feasible and has less negative impact on pulmonary mechanics.

Table 1 (ABS 15). Dynamic compliance (Cdyn) at different time points.

	Cdyn ± SD; mL/cmH_2O			
	Intubation	10 min	20 min	P
RA (n = 13)	3.4 ± 1.6	3.4 ± 1.6	3.2 ± 1.3	n.s.
HIOX (n = 16)	3.3 ± 0.8	3.1 ± 0.8	2.8 ± 1.0	< 0.05

RA: room air; HIOX: 80% oxygen.

ABS 16

USE OF INHALED NITRIC OXIDE IN VERY LOW BIRTH WEIGHT INFANTS WITH PROLONGED PPROM

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INTRODUCTION

Although the use of inhaled Nitric Oxide (iNO) is not recommended in hypoxic preterm infants below 34 weeks of gestational age, its off-label use in this particular kind of patients has recently increased, due to the rising use by the attending neonatologists of functional echocardiography to assess the hemodynamics in these patients. Preterm Premature Rupture of Membranes (PPROM), lasting more than 7 days, is often associated with oligohydramnios, pulmonary hypoplasia and pulmonary hypertension, resulting in severe hypoxic respiratory failure, that may improve with iNO. Functional echocardiography allows a better understanding of the pathophysiology, an early identification of the patients requiring treatment with iNO and guides treatment. Our aim was to evaluate the clinical data of all the patients below 32 weeks of gestation treated with iNO at our institution and the effects of this treatment.

METHODS

This was a retrospective observational study, conducted from January 2010 to December 2015 in the neonatal unit of our institution. Inclusion criteria were: gestational age ≤ 32 weeks and/or birth weight ≤ 1,500 g, PPROM ≥ 7 days, therapy with iNO. Data were collected from neonatal and maternal medical charts.

RESULTS

From January 2010 to December 2015, 16 patients fulfilling the inclusion criteria were treated with iNO at our institution. 6 males (37.5%) and 10 females (62.5%). Mean (SD) gestational age was 28.00 weeks (0.57), mean (SD) birth weight was 1,450 g (708). All infants received antenatal steroids and 7 had clinical chorioamnionitis (44%). Mean (SD) Apgar score was 4 (1) at the first minute of life and 7 (1) at the fifth minute of life. Mean (SD) starting dose of iNO was 17 ppm (6) and mean (SD) duration of therapy was 96 hours (82). Mean (SD) oxygenation indexes before and after treatment were significantly different: 28 (15) and 8 (6). Survival to discharge was 10/16 (62.5%). Incidence of other adverse outcome were: chronic lung disease at 36 weeks of PMA 60%, IVH (≥ grade 2) 32%, post-hemorrhagic hydrocephalus 20%, leukomalacia 40%, ROP 40%, NEC (> Bell stage 2) 9%.

CONCLUSIONS

Our data confirm that off-label use of iNO in preterm infant below 32 weeks of gestational age with prolonged PPROM and evidence of pulmonary hypertension results in a significant improvement in the oxygenation. The effects on long term outcomes need to be further evaluated before incorporating this treatment in the current clinical practice.

Infections

ABS 17

CONGENITAL SYPHILIS: THE IMPORTANCE OF AN EARLY DIAGNOSIS

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INTRODUCTION

Although congenital syphilis is rare, infected infants may suffer from severe consequences, including cerebral palsy, sensorineural hearing loss, musculoskeletal deformity, till to death. The longer the time that primary infection occurs before pregnancy, the more benign the outcome in the infant. Untreated primary or secondary syphilis in pregnancy results in a 25% risk of stillbirth, a 14% risk of neonatal death, a 41% risk of alive infected infant and only a 20% chance of a healthy,

uninfected infant. Untreated late syphilis (i.e., early and late latent syphilis that occurs more than one to two years after infection) results in a 12% risk of a stillbirth, a 9% risk of neonatal death, a 2% risk of an infected infant and a 77% chance of an uninfected baby. Women whose infection occurs during the first year after delivery may still infect their child.

CASE REPORT

G.L. was born at 30.5 weeks of gestation by an urgent caesarean section for fetal deceleration and absent diastolic brain flow to the fetal ultrasound. At birth, the newborn, floppy and cyanotic, immediately required respiratory support and the placement of a central line for persistent hypoglycemia. The brain ultrasound showed bilateral intraventricular hemorrhages: grade III into the right ventricle, grade II-III inside the left. Blood samples revealed: hemoglobin 11.1 g/dl, lactate 12 mmol/l, prothrombin time 6.15 I.N.R., activated partial thromboplastin time 3.12 ratio, WBC 12,350/mm^3, C-reactive protein 157 mg/L. Blood cultures were performed as well as maternal serology for HIV, HbsAg, HCV, never done before, and for syphilis and CMV, negative in the first trimester. Empirical antibiotic therapy was started with ampicillin, gentamicin and metronidazole. For a rapid deterioration of the clinical conditions the baby was intubated and started on phenobarbital, fentanyl and midazolam for refractory seizures.

RESULTS

Newborn blood cultures resulted negative for bacterial infection, while the mother had both quantitative nontreponemal serologic test (venereal disease research laboratory [VDRL] test of 8, NV 5,120) positive, as had the child. Benzylpenicillin was immediately given both, without, however, avoiding the child's death.

CONCLUSIONS

Neonatal syphilis may have serious effects on the infant. Vertical transmission may occur at any time during gestation. Early treatment during pregnancy is essential to prevent the transmission to the fetus; thus, maternal serology must be checked not only at the beginning of pregnancy but also in the last trimester or at birth, as the mother remains contagious throughout the child first year of life.

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ABS 18

CHALLENGES IN VANCOMYCIN TREATMENT OF NEONATAL SEPSIS CAUSED BY STAPHYLOCOCCUS EPIDERMIDIS

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INTRODUCTION

Various clinical guidelines about optimal vancomycin dosing in neonates exist, but all of them lack firm theoretical grounds. We wanted to examine the relationship between vancomycin PK/PD markers, coagulase-negative staphylococci (CoNS) MICs for vancomycin and clinical therapeutic success in a group of neonates treated for suspected CoNS infection. Our aim was also to determine whether changes in treatment regime in the selected Paediatric Intensive Care Unit (PICU) are needed to optimise therapy for suspected CoNS sepsis in neonates.

METHODS

We performed a retrospective study at the PICU at University Medical Centre Ljubljana to examine the effectiveness of current empiric vancomycin dosage for neonates with suspected intravenous catheter-related infections caused by CoNS. We retrospectively reviewed clinical data of all neonates treated with vancomycin for CoNS sepsis in the selected PICU between 2012 and 2015. Serum trough concentrations were collected and compared to dosing protocols and treatment success. The antibiotic susceptibility profile of CoNS isolates was also examined.

RESULTS

Among 35 neonates (median gestational age 37 weeks, min 24, max 41) with positive blood cultures for *S. epidermidis*, 30 neonates (85.7%) received vancomycin therapy for suspected systemic infection indicated by laboratory and clinical markers. Mean value of all vancomycin trough concentrations was 12.1 μg/ml ± 8.0 μg/ml. In 2 neonates 11 (11.1%) trough measurements were below 5 μg/ml and in 10 neonates 29 (29.3%) measurements were above 20 μg/ml. Eleven neonates were treated strictly by recommended protocol. In all neonates therapeutic success was achieved. No marked side effects related to

vancomycin therapy were noticed in any of the treated patients. MIC for vancomycin was ≥ 2 μg/ml for most (26) of *S. epidermidis* strains.

CONCLUSIONS

Our cohort of patients, treated with vancomycin, exhibited a wide variability in vancomycin dosage and measured serum trough concentrations and showed how difficult it is to achieve the same conditions in all neonatal patients using one single algorithm. Despite all this, treatment success in case of intravenous catheter-related infections caused by CoNS seems most probable. A vancomycin serum trough range of 10-20 μg/ml seems safe and could be considered in environments where majority of CoNS strains have MIC for vancomycin ≥ 2 μg/ml.

ABS 19

A QUALITY IMPROVEMENT PROJECT AIMED AT REDUCING THE INCIDENCE OF LATE ONSET INFECTIONS IN A LEVEL III NEONATAL UNIT

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INTRODUCTION

Late onset sepsis is a common complication of central catheters in VLBW neonates and impacts significantly on mortality and morbidity. To reduce the burden of late onset infections, we conducted this quality improvement project (QIP). Aims of the QIP were: to collect pre-intervention data on late onset infections in our NICU, to develop strategies to reduce the risk of and to assess the effect of the intervention.

METHODS

This QIP was conducted at our institute from January 2015 to December 2016. In the pre-intervention phase (problem identification) data on late onset neonatal infections in VLBW infants from January to December 2015 were collected and analysed. The intervention phase (problem elimination) was conducted from June 2015 to December 2015. A multidisciplinary team composed of four neonatal nurses and one neonatologist developed new institutional protocols for the management of central venous catheters according to the most recent evidence available (SHEA 2014, CDC 2014, EPIC 2013, PICC 2012) and run a multifaceted educational intervention to train the nursing and medical staff. In the post-intervention phase from January to December 2016 a multiple choice questionnaire was done to evaluate the theoretical efficacy of the educational intervention and then data on late onset infections were collected and compared to the ones of the pre-intervention phase.

RESULTS

In the pre-intervention phase data of 69 neonates were collected. Mean (SD) of weight and gestational age were: 1,065 g (301) and 28.47 weeks (3.18). The incidence of late onset infections was 48%. The multiple regression analysis showed that the only risk factor significantly associated to the incidence of infections was the dwell time of the central venous catheter (beta coefficient 0.196, $p < 0.05$). The multiple choices questionnaire showed a significant improvement from 63 to 79% of correct answers after the educational intervention ($p < 0.05$). In the post-intervention phase data of 51 neonates were collected. Mean (SD) of weight and gestational age were: 1,107 g (310) and 28.60 weeks (3.09). The incidence of late onset infections was 42.9%. The odds ratio for late onset sepsis before and after the course is 0.816 with a confidence interval of 0.816-1.690.

CONCLUSIONS

Our data confirm that the dwell time of the central venous catheter is a major risk factor for late onset infections. Our data showed that an educational intervention is useful to improve the theoretical management of central venous catheters and may help to reduce the incidence of late onset sepsis.

ABS 20

UNUSUAL CRP TREND IN LATE ONSET SEPSIS OF THE PREMATURE < 27 WEEKS OF GESTATIONAL AGE

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INTRODUCTION

Neonatal sepsis represents a frequent problem in Neonatal Intensive Care Units, contributing to neonatal mortality. Consensus definitions for

sepsis are not appropriate for very low birth weight neonates (VLBW). The gold standard for diagnosis is blood culture but in VLBW the possibility of negative result is high [1]. For early diagnosis, clinical signs and biomarkers are essential. White blood cells and platelets count has been found barely useful for the early diagnosis of neonatal sepsis. C-reactive protein (CRP) is a late phase marker with high specificity but low sensitivity. VLBW show lower CRP peak values during infection. Literature displays wide ranges of CRP cut-off values; the most used is 10 mg/L [2]. Procalcitonin (PCT) is a promising early phase marker for the detection of neonatal sepsis [3].

MATERIAL AND METHODS

We included 25 VLBW. CRP (> 10 mg/L) and PCT (positive cut off > 0.5 ng/ml) values were collected. CRP was considered at the beginning of clinical signs (T0), after 1 (T1), 3 (T3) and 5 days (T5). Our interest was to compare biomarkers mean values in the two groups, especially CRP trend.

RESULTS

Mean GA of the 25 VLBW was 26^{+2} weeks, mean weight 784 ± 173 g. Mean disease onset time was 11 ± 8 days. Coagulase negative staphylococci (8/25) and *S. aureus* (7/25) were the principal pathogens identified. 9/25 neonates had negative blood culture. All VLBW started antibiotic prophylaxis at birth (piperacillin, netilmicin). A statistically significant difference resulted for platelets (p 0.0210). CRP value at T0 resulted negative only in the < 27 weeks GA group (9 ± 7 mg/L). The difference between the two GA groups turned statistically significant (p 0.0011) showing that in VLBW the rise of CRP is not always synchronous with the start of disease. The difference of CRP was also significant at T3 (p 0.0470) and T5 (p 0.0199) (**Fig. 1**). PCT values resulted positive and superimposable in the two groups, resulting more reliable in the diagnosis of the early phase of neonatal sepsis [3]. We didn't identify significant differences for risk factors, etiology and antibiotic therapy.

CONCLUSIONS

In the < 27 weeks GA group we found a particular CRP trend, with negative value at T0. CRP is a late phase biomarker and has low sensitivity especially in the VLBW. In order to not delay diagnosis and antibiotic treatment, it's mandatory to continue research on other biomarkers as PCT, when suggestive clinical manifestations exist.

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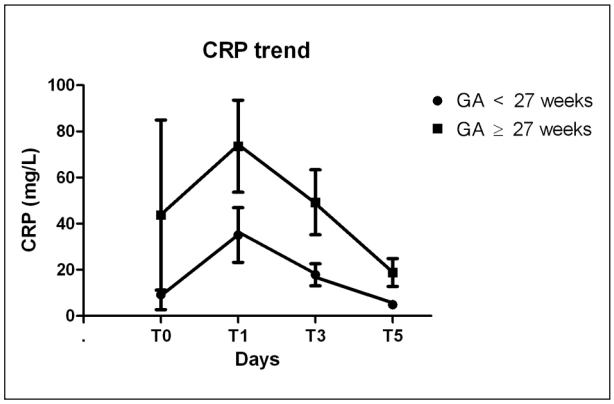

Figure 1 (ABS 20). C-reactive protein (CRP) trend in the 2 groups.

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ABS 21

IS HAPTOGLOBIN (HP) DOSAGE PREDICTIVE OF INFECTION IN THE FIRST WEEK OF LIFE?

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INTRODUCTION

Haptoglobin (Hp) is a protein that binds hemoglobin, but it has also other functions: inhibition of release of Nitric Oxide from vessels wall, inhibition of prostaglandin synthesis and angiogenesis stimulus, protection from free radicals. Hp is an acute-phase protein and its concentration increases during inflammatory response. Iron becomes less available for bacteria growth after binding of Hb with Hp and it's a non-specific mechanism of defence against bacterial infections, with an IG similar function. Hp seems to have specific defence ability, for example in interaction of B cells with red cells, T cells, monocytes, neutrophils and endothelial cells. Hp has been studied as acute-phase protein together with other proteins and markers in field of diagnosis and therapy of sepsis in neonatal age, in fact in this period Hp and other acute phase proteins increased.

Our study was aimed to assess if Hp can be considered an early, sensitive and predictive index of infections since the first days after birth, since we know that this protein is absent in serum of most term infants without infection, its concentration increases in the first week of life and reaches normal levels usually in the first month of life.

MATERIAL AND METHODS

We compared 18 healthy neonates with 30 infected neonates (half were preterm). Most of sick neonates was considered at high risk since prenatal age (PROM, positive vaginal tampons, maternal fever). In all subjects we have performed in the 1st, 3rd and 7th days of life: band-cells parameters and band-cells count. CRP, Hp (this protein was dosed with Tina-Quant test, Roche-Hitachi). Moreover, we performed blood, urine, gastric aspirate colture, and pharynx, auricolar and ocular cultures.

RESULTS

We observed that in the newborn of any gestational age with infection or sepsis, there is not a sensitive movement (p not significant) of Hp levels compared with controls.

CONCLUSION

We have demonstrated that Hp dosage is not a useful index of infection in the first days after birth.

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Nutrition

ABS 22

EXCESSIVE WEIGHT LOSS IN THE EXCLUSIVELY BREASTFED NEONATE DURING THE FIRST DAYS OF LIFE: A PILOT STUDY IN A GREEK MATERNITY HOSPITAL

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INTRODUCTION

Healthy, full-term, exclusively breastfed infants are expected to lose weight in the first days postnatally. The percentage of weight loss (WL) varies among newborns, while substantial WL is associated with increased morbidity. The second and third day of life are the days when maximum WL occurs. A previous study by our group reported a mean WL of exclusively breastfed infants of 6.9%. The present study aimed at evaluating the timing and biochemical impact of excessive WL in breastfed infants during birth hospitalization.

MATERIAL AND METHODS

The study population comprised of exclusively breastfed infants born at Aretaieio Hospital from 1/4/2017 to 31/12/2017 with gestational age ≥ 36 weeks who lost at least 10% of their birth weight (BW) during birth hospitalization. Clinical data of these newborns were collected prospectively from their hospitalization charts. Hour-by-hour newborn WL nomograms created by Flaherman et al. [1] available at http://www.newbornweight.org were used for computing the percentile of percent WL by time after birth.

RESULTS

44 out of 618 infants born from 1/4/2017 to 31/12/2017 lost more than 10% of BW during postnatal hospitalization (7.1%). The majority of them (63.6%) were born by cesarean section. The third day of life was the time of maximum WL for the majority of these infants (68.2%). According to the above mentioned percentile curves, maximum WL corresponded to 75th-90th percentile for 25%, 90th-95th percentile for 34.1% and > 95th percentile for 40.9% of newborns. Hypernatremia (Na+ > 146 mmol/L) was detected in 82% of cases, while CRP was elevated (> 0.5 mg/dL) in 14.3% of cases during the first day of excessive WL (>10% of BW) without any other clinical or biochemical evidence of infection.

CONCLUSIONS

Our results demonstrate that WL ≥ 10% of BW is common in exclusively breastfed neonates. In the majority of cases of excessive WL, the maximum WL occurred during the third day and corresponded to > 90th percentile of WL, while hypernatremia was the most common biochemical finding. In conclusion, hour-by-hour newborn WL nomograms may guide clinical care of these neonates but more studies are needed to evaluate their clinical implementation.

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ABS 23

PERCEPTIONS OF HEALTH CARE PROFESSIONALS ON BREASTFEEDING PRACTICES

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INTRODUCTION

The World Health Organisation (WHO) and the American Academy of Pediatrics (AAP) recommend exclusive breastfeeding for the first 6 months of life. Although several actions have been undertaken and projects have been designed, there are still misconceptions among health care professionals concerning basic issues of breastfeeding, and misleading information is often provided to parents. This leads to difficulties in promoting and supporting breastfeeding. Aim of the study was to investigate the perception of a mixed group of health care professionals on common breastfeeding aspects.

MATERIAL AND METHODS

In November 2017, during the Annual Seminar on Breastfeeding, organized by the Neonatal Department, National and Kapodistrian University of Athens, Aretaieio Hospital on the occasion of the World Breastfeeding Week, we distributed to the participants (pediatricians, midwives, obstetricians and medical and midwifery students) a 19-question true-or-false questionnaire, covering all important issues of breastfeeding. At the end of the seminar, the results of the survey were presented and discussed in detail.

RESULTS

The analysis of the results revealed that misconceptions related to breastfeeding are still common among healthcare professionals directly associated with the dyad mother-infant, like pediatricians, midwives and obstetricians. The most common misconception involved the necessity of nipple care after breastfeeding, since 65% of respondents believe that nipples should be cleaned with chamomile, water or soap. 58% of the respondents believe that in cases of breast milk discoloration (e.g. green or brown), breastfeeding must be temporarily discontinued. Furthermore, an important percentage of the health care professionals believe that in cases of wounded nipples breastfeeding should be avoided, that silicone nipples are essential during the first days postpartum and that the breastfed neonate must be motivated every 3 hours in order to be properly fed. Additionally, the majority of health care professionals, were well informed about other issues related to breastfeeding. In particular, 96% of them rejected the administration of chamomile during the night and were well aware that excessive weight gain in the breastfed baby is not an indication for reduction of breastfeeding frequency. Similarly, almost all the respondents did not attribute the baby's crying after 30-minute nursing to inadequate amount of breast milk.

CONCLUSIONS

In conclusion, there are still misconceptions about breastfeeding even among those health care professionals directly dealing with the dyad mother-newborn involved in breastfeeding promotion and support. Continuous training and updating of the latest data on breastfeeding is necessary in order to avoid misleading consultation of the nursing mother by the medical staff involved.

ABS 24

POSTNATAL HYPOTROPHY IN NEWBORNS WITH EXTREMELY LOW BIRTH WEIGHT

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INTRODUCTION

To study the incidence and analyze the causes of postnatal hypotrophy in the newborns with extremely low birth weight.

MATERIAL AND METHODS

This is a retrospective study that includes all survived to the discharge newborns with extremely low birth weight for the period 2005-2016 who are treated in Clinic of Neonatology of UMHAT, Pleven, Bulgaria. The patients were divided in 3 groups according to their weight at discharge: adequate to post conceptional age (group 0), between 3rd and 10th percentile (group 1) and below 3rd percentile (group 2). The anthropometric indices

were interpreted according to the Fenton growth chart 2013 with gender differentiation. Studied indices were: mode of delivery, gender, birth weight (BW), gestational age (gestation weeks), presence of intrauterine infection, congenital anomalies, need of intubation before the 5th postnatal minute, duration of mechanical ventilation (MV), oxygen therapy, parenteral nutrition, characteristics of enteral nutrition, neonatal complications (intraventricular hemorrhage, patent ductus arteriosus [PDA], necrotizing enterocolitis), late complications (bronchopulmonary dysplasia, toxic liver damage with cholestasis, nosocomial infections, anemia, cerebral damages), weight and age at discharge.

RESULTS

73 newborns were evaluated. The incidence of postnatal hypotrophy was 84% and 66% of all babies suffered from severe hypotrophy (weight under the 3rd percentile according to Fenton growth chart). Significant difference is present between groups 0 and 2 according to BW (one quarter of the patients of group 2 was born with BW < 800 g; all the babies of group 0 were heavier than 800 g; p 0.04), intrauterine growth restriction – IUGR (there were no cases of IUGR in group 0, but in group 2 they were 27%), duration of MV (mean duration 5 ± 4 and 15 ± 15 days, respectively; p < 0.05), day of reaching the optimal nutritive tolerance (p 0.015), incidence of PDA (0 and 29%, respectively; p < 0.05), need of late blood transfusions (BT) after 28th postnatal day (1.6 ± 0.9 and 2.8 ± 1.7 BT per patient, respectively; p 0.002), birth at discharge (3,192 ± 1,128 and 2,497 ± 448 g, respectively; p 0.003).

CONCLUSIONS

According to our data, postnatal hypotrophy in the babies with extremely low BW is often a problem. The babies with BW < 800 g and those with IUGR are at risk. Prolonged respiratory dysfunction, PDA, difficulties in the enteral nutrition are aggravating factors. The hypotrophic babies have been suffering complex problems which is demonstrated by the need of more late BT. These patients are discharged with lower weight which is precondition for complications in infancy.

ABS 25

NECROTIZING ENTEROCOLITIS AND PREMATURITY

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INTRODUCTION

Necrotizing enterocolitis (NEC) is characterized by a variable degree of intestinal necrosis and may be complicated by perforation requiring surgery. It is a common gastrointestinal emergency in neonates, but NEC is rarely seen in term babies if appropriated for the gestational age. Low birth weight is the most important risk factor for NEC development (extreme prematurity, birth weight < 2.0 kg). Susceptibility to NEC is also increased by the following factors: formula feeding; bacterial colonization of nursery; history of asphyxia, respiratory distress, exchange transfusion and congenital cardiac disease. This study was introduced to establish the incidence, during the last ten years, of NEC among preterm infants.

METHODS

A retrospective analysis was undertaken and the total number of case reported (40 newborns) were considered to be true cases of NEC.

RESULTS

Overall 50% of cases were male. The range of birthweight for all cases was 420-4,390 g, the gestational age between 24-42 weeks. Fifty five percent of all newborns were of gestational age < 28 weeks (birth weight < 1,000 g). There was a significant negative correlation with gestational age and day of onset of NEC (p < 0.001). The mortality of the extremely low birth weight (ELBW) infants was higher than the mortality of the total group (62% versus 30%).

CONCLUSIONS

In our 10 years' experience NEC was found to be most severe in those infants with the lowest birth weight and lower gestational age. The gut in prematurity presents: immature immune system, gastrointestinal dysmotility and immature mesenteric vascular regulatory capacity. The increased incidence of NEC in these newborns may be due to greater susceptibility of premature gut to hypoxia-ischemia, hyperosmolar feeds and especially to infections.

ABS 26

GROWTH AND FEEDING RATES IN THE FIRST YEAR OF LIFE IN OUR POPULATION OF LATE PRETERM AND SGA NEWBORNS: PRELIMINARY DATA

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INTRODUCTION

The growth in the first years of life of some categories of newborns "at lower risk" such as the so-called "late preterm" newborns has been only recently investigated by studies in literature, more focused instead on the short/long term development of "most at risk" categories such as severely premature babies. There are also numerous studies describing the growth of small for gestational age (SGA) term infants and their delayed catch-up growth compared to the growth of full-term newborns of adequate weight. The aim of our study is to evaluate the growth in the first two years of life of late preterm newborns of adequate weight compared to the growth of SGA term and preterm infants.

MATERIALS AND METHODS

We elaborated a retrospective and prospective study that aims to compare the weight growth in the first year of life of three subgroups of newborns: late preterm newborns of adequate weight (LP-AGA), late preterm newborns small for gestational age (LP-SGA) and term infants small for gestational age (T-SGA), born at our Hospital from 1 January 2013 to 31 July 2017. We present the preliminary data of this study. We collected data from 132 patients: 70 LP-AGA (median GA = 36 weeks), 12 LP-SGA (median GA = 36 weeks), and 50 T-SGA (median GA = 38 weeks). Data were obtained from our Department database and integrated with the values from pediatric outpatient controls. Data about birth weight of all newborns were corrected for gestational age at 40 weeks and the corresponding weight percentile by sex was calculated using the LMS-method: this method was then applied to each weight measurement in the following months of life. The distribution of infant growth percentiles, divided into the 3 groups analyzed, was then deduced by regression analysis, which provides a linear growth curve for each group. Breast or artificial feeding rates were also assessed in the first months of life, together with age of weaning.

RESULTS

We observed that LP-AGA and LP-SGA newborns during the first year of life show a similar pattern of growth with a smooth linear increment. Obviously LP-AGAs maintain a higher percentile in comparison to the LP-SGAs. T-SGA newborns, on the other hand, show a growth that tends to increase in the first year of life with a statistically significant difference compared to late preterm newborns ($p < 0.01$). At birth and at the first month of life almost all (94%) of the newborns of all 3 groups were exclusively breastfed. At 6 months of age only 11.4% of LP-AGAs, 16.6% of LP-SGAs and 8% of T-SGAs were breastfed. Weaning was started in all groups (97% of infants) at the 6th month of life.

CONCLUSIONS

During the first year of life, late preterm infants, even if SGA, show a linear and constant growth, while term SGA show a greater growth acceleration. No differences in feeding pattern between the three groups of newborns were found. However, further prospective studies and with a wider population are necessary in order to confirm our data.

ABS 27

IRON PIDOLATE IN PRETERM NEWBORNS FOR PREVENTION OF ANEMIA OF PREMATURITY: FIRST METABOLOMICS RESULTS

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INTRODUCTION

Iron is particularly important in preterm infants to meet the high demands for hematopoiesis, growth and development. Thus, supplementation with iron is indicated in preterm infants to prevent anemia of prematurity. Here we have performed a preliminary investigation of the urinary metabolome of preterm infants during an iron supplementation period of 2 months.

POPULATION STUDY AND METHODS

This study was carried out on urine samples of 23 preterm infants (GA between 28^{+3} and 36^{+6} weeks and birth weight between 790 and 1,890 g) admitted to the Neonatal Intensive Care Unit, Neonatal Pathology and Neonatal Section, Azienda Ospedaliera Universitaria, University of Cagliari, Italy. Infants received a prophylaxis with iron pidolate 3 mg/kg/day to

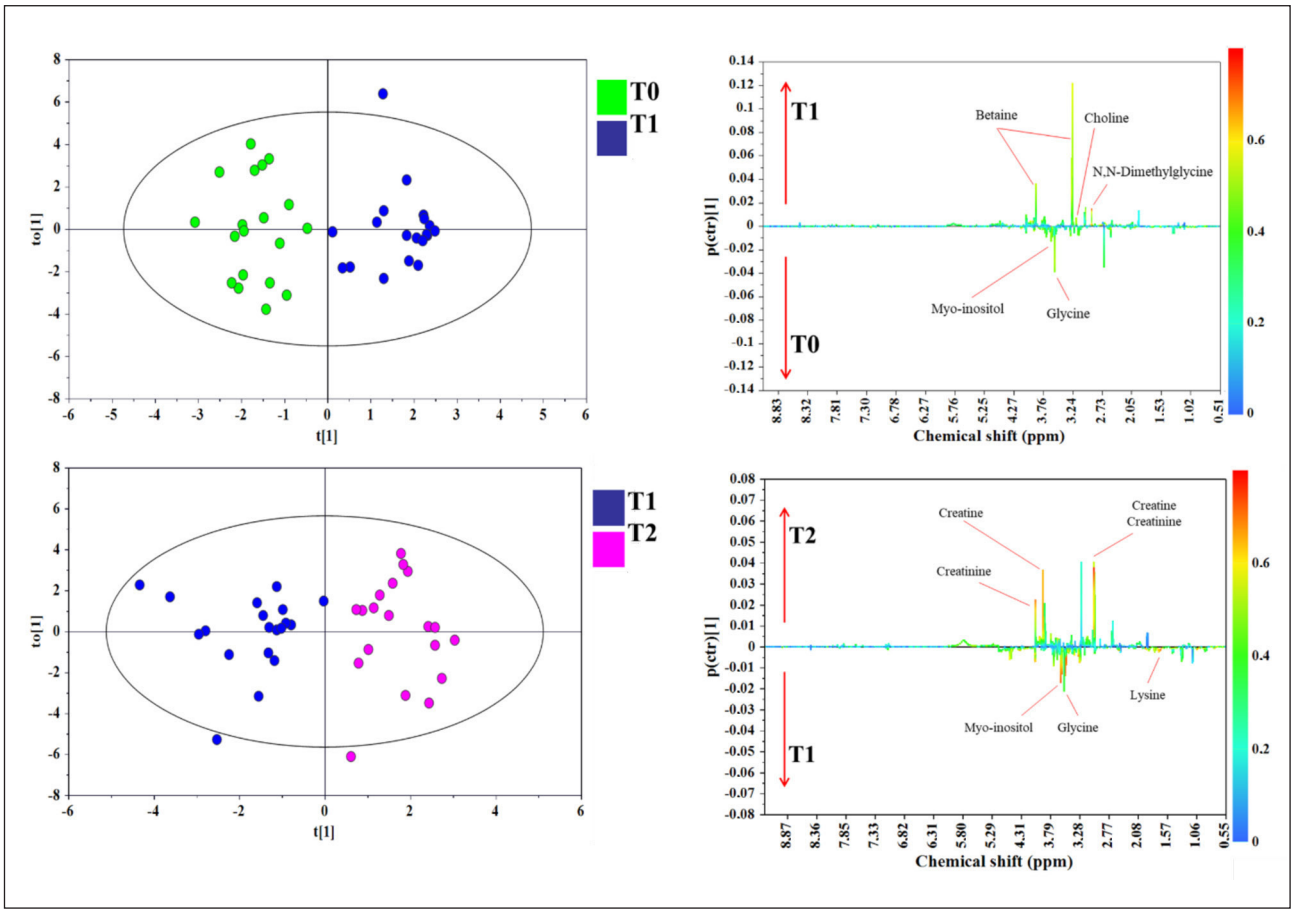

Figure 1 (ABS 27). OPLSDA scores (left) and coefficient (right) plots for the models built with the infant urinary 1H NMR profiles for the pairwise comparisons T0 vs T1 and T1 vs T2.

prevent anemia of prematurity. Only 19 infants completed the trial. Urine was collected non-invasively with cotton balls at three time points: at discharge (T0), at 1 (T1) and 2 (T2) months after the iron treatments. 1H NMR spectroscopy and multivariate statistical analysis were used to analyse the urinary metabolic profile.

RESULTS

Significant differences were observed between samples collected at the three time points (**Fig. 1**). The most important metabolites involved were: betaine, choline, creatine, glycine, myo-inositol and N,N-dimethylglycine. We observed a temporal increase of betaine and choline, both being growth metabolites. Choline and creatine protects brain from anemia effects. Creatine also exerts protective antioxidant effects on red blood cells. The decrease of glycine and myo-inositol could be related to a higher availability of the two metabolites, favoring hemoglobinization and integrity of red blood cells. Moreover, the decreasing level of dimethylglycine from T1 to T2 could be associated to anti-anemic effects, thus correcting the metabolism of red blood cells.

DISCUSSION

To the best of our knowledge, this is the first metabolomics study on the role of iron treatment on the metabolism of preterm infant [1-8]. Although these results are preliminary, the observed temporal changes in the concentrations of the metabolites could potentially be linked to pathways related to red blood cells. Further studies are needed in order to confirm this hypothesis. Metabolomics seems to be a promising non-invasive technology for the study of anemia of prematurity.

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