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# Selected Abstracts of the 6th International Congress of UENPS • Session "Neonatology and NICU clinical care and practices"

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**ABS 1**

## BILATERAL CLAVICLE FRACTURE: A RARE CAUSE OF PERSISTENT CRYING

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### INTRODUCTION

A clavicle fracture is one of the most frequent traumatic injuries associated with childbirth. It is usually unilateral, with an estimated incidence of 0.6% to 1.6% in vaginal deliveries. Factors associated with an increased risk include: gestational diabetes, fetal macrosomia (> 4,250 g), gestational age, post term pregnancy (> 42 weeks), prolonged labor and shoulder dystocia. The bilateral fracture form is extremely rare. Some genetic syndromes and metabolic diseases with bone involvement increase the risk of bone fractures in the fetus. Therefore, a newborn presenting with multiple fractures, especially in the absence of evident trauma during newborn extraction, should be further investigated. In most cases, the treatment is conservative and the prognosis is good, with resolution in the first 3 months. However, complications may occur, such as brachial plexus lesion, which may require a more specific intervention.

### CASE REPORT

Herein, we present the case of a term newborn with bilateral clavicle fracture. The diagnosis was made on the 6th day of life, while the baby was investigated for recurrent/persistent crying since birth. He had no other signs and was apparently well, which made the diagnosis harder to achieve.

### RESULTS

There are few reported cases of bilateral clavicle fracture associated with childbirth and most of them present with complications. In this case, the imaging confirmed the diagnosis and contrasted with the nearly absent clinical manifestations (no brachial plexus injury), contrary to the cases described in the literature.

### CONCLUSIONS

Sometimes requiring a high index of suspicion, bilateral clavicle fracture is a rare form of traumatic injury associated with childbirth and should be excluded when risk factors are present. As in unilateral fractures, bilateral presentation is estimated to be underdiagnosed.

**ABS 2**

## NEONATAL TRANSPORT DURATION AND SHORT-TERM OUTCOME IN VERY-LOW-GESTATIONAL-AGE NEONATES

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### INTRODUCTION

Neonatal transport is an integral part of neonatal care and has an important influence on neonatal outcome. The aim of our study was to investigate the relation between transport duration and outcome, defined as death and/or severe intracranial hemorrhage (ICH grade III and IV) in very low gestational age (VLGA) neonates.

### METHODS

Outborn VLGA neonates (< 32 gestational weeks [GW]) from single or twin pregnancies, who were transported within the first 72 hours of life to our tertiary care NICU were included in the study. Neonates from triple pregnancies (n = 3), with gestation under 24 GW (n = 3) and with multiple major congenital anomalies (n = 1) were excluded from the study. The study period was June 2012-December 2013. The NICU covers an area of about 2 million inhabitants and supports critically ill neonates from nearby maternity hospital, as well as from other seven NICUs of first or second level of neonatal care. We divided our sample into two groups: short transport (ST) group, with transport duration up to 10 minutes, and long transport (LT) group, with transport duration of 60-90 minutes. Main outcomes were neonatal death and/or severe ICH.

### RESULTS

Study sample consisted of 127 VLGA neonates, 97 (76.38%) in the ST and 30 (23.62%) in the LT group. Neonatal death and/or severe ICH were present in 27 (27.83%) neonates in the ST and in 15 (50%) neonates in the LT group, which was significantly different (p = 0.027, OR 2.59, 95%

CI 1.11-6.02). Significantly different variables between the groups were prenatal corticosteroids ($p < 0.0001$), C-section delivery ($p = 0.007$), SGA status ($p = 0.047$) and respiratory support at delivery ($p = 0.011$). After multivariate analysis with the above-mentioned variables, the main outcome was still significantly more prevalent in the LT group ($p = 0.035$, OR 3.26, 95% CI 1.08-9.77).

CONCLUSIONS

In our study sample, longer neonatal transport duration is related to poor outcome, in the form of death and/or severe intracranial hemorrhage.

## ABS 3

## PEMPHIGOID GESTATIONIS – A RARE CASE IN TWIN PREGNANCY

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INTRODUCTION

Pemphigoid gestationis (PG) is a rare autoimmune bullous dermatosis of pregnancy, with an overall incidence around 0.5 cases per million people per year. Most patients develop specific antibodies against 2 hemidesmosome proteins, BP180 and less frequently BP230. Cross-reactivity between placental tissue and skin has been proposed to play a role. PG typically manifests during late pregnancy, with an abrupt onset of erythematous urticarial patches and plaques. The rash spreads peripherally. Only 10% of newborns from affected mothers develop skin lesions from passive transfer of antibodies through the placenta. Prematurity and low birth weight increase the possibility of clinical manifestations in newborns.

CASE REPORT

Herein we describe the case of 38-year-old primigravida with a dichorial twin pregnancy, who presented at 21 weeks of gestational age with general cutaneous pruritus, initially starting in the abdomen and then spreading to the chest and limbs. A skin biopsy was taken and PG was confirmed. She was started on corticotherapy with a good response, but she needed continuous treatment throughout the remaining pregnancy. Labor onset occurred at 35 weeks gestational age, and both babies (male and female siblings) were delivered by cesarean section.

RESULTS

The male newborn had issues adapting to breastfeeding and was started on formula milk. On day 2, some erythematous urticarial plaques appeared, later forming vesicles. The female sibling, who was well adapted to breastfeeding, started showing similar skin changes only when the dosage of maternal corticotherapy was decreased. Both babies tested positive for anti-BP180 antibodies and, at 3 months old, both of them were completely asymptomatic with no specific treatment being done.

CONCLUSIONS

PG is considered a benign disease, with complete regression post partum. Newborns affected by maternal antibodies exposition may develop skin lesions, but with no apparent major complications.

## ABS 4

## DEVELOPMENT OF A CLINICIAN-REPORTED OUTCOME (ClinRO) MEASURE TO ASSESS READINESS FOR DISCHARGE FROM NEONATAL CARE AMONG EXTREMELY PRETERM INFANTS

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INTRODUCTION

Assessment of readiness for discharge from neonatal care varies geographically and by healthcare system. We undertook to develop a ClinRO (following FDA PRO Guidance 2009) to standardize assessment of discharge readiness (DR) in extremely preterm infants for accurate evaluation of interventions that may affect overall health and DR in this population. Here we report the first stages of this work and evolution of our initial concept.

METHODS

A targeted literature search was conducted to identify articles on factors related to DR and length of hospital stay (LOS) in extremely

preterm infants; 22 articles were selected for review, including relevant guidelines. In addition, 4 expert neonatologists from the UK, US and Sweden (authors MT, RW, JH, IH-P) participated in interviews and group discussions on DR criteria in their practices.

RESULTS

Key criteria for DR and predictors of LOS were broadly consistent between the literature and practices of the interviewed neonatologists (**Tab. 1**). However, the interviews identified challenges to standardizing assessment of DR due to variability in standards of neonatal care, resources, home support and proximity of outpatient support, which influence timing of discharge. We therefore revised the ClinRO concept from DR to functional status (an indicator of neonates' overall health encompassing physical, physiological and clinical status) as infants progress towards discharge, independent of the care system or home situation. As a next step, a Delphi panel will be performed to inform the content of the ClinRO for assessment of functional status.

CONCLUSIONS

Variability between care systems challenges standardization of assessment of DR for extremely preterm infants. We planned originally to develop a ClinRO for DR; however, to address the challenges identified, the concept has evolved to an assessment of functional status. Further work is ongoing to refine the assessment criteria and develop a fully validated tool.

**Table 1 (ABS 4).** Key criteria for readiness for discharge from neonatal care.

| Factors | Criteria for discharge |
|---|---|
| **Feeding** | Ability to feed enterally to maintain consistent weight gain |
| **Breathing** | Stable respirations without positive airway pressure support |
| **Thermostability** | Ability to maintain normal temperature in open crib or bassinet |
| **Physical/ physiological stability** | Includes absence of apnea, oxygen desaturation, and gastrointestinal disturbances such as severe reflux |
| **Retinopathy of prematurity** | Stable or regressing disease only |
| **Non-physical factors** | Includes parental readiness, parental interaction with infant, social network support, transportation, home situation, fluency in national language/access to translation services for communication during follow-up |

## ABS 5

## THE EFFECT OF THYROID HORMONES ON NICU ADMISSION DUE TO TRANSIENT TACHYPNEA OF NEWBORN IN LATE PRETERM AND TERM INFANTS

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INTRODUCTION

Epithelial $Na^+$ channels (ENaC) are involved in the pathogenesis of transient tachypnea of the newborn (TTN). The expression of ENaC is associated with hormonal changes that occur during labor, including changes in thyroid hormones. We aimed to assess the effect of thyroid hormones on NICU admission in late preterm, early term and term infants.

METHODS

All infants of gestational age ≥ 34 weeks born at the American Hospital between January 2008 and December 2013 were involved in the study. The study group consisted of infants admitted to NICU. The medical records of the babies and thyroid functions obtained in the first days were collected. Student's t test, Mann-Whitney U test and chi-square tests were used for statistical analysis. Logistic regression analysis was used to determine independent predictors of NICU admission.

RESULTS

7,739 infants (737 late preterm, 3,418 early term, 3,584 term) were included in the study. A total of 404 (5.2%) infants (29.3% of late preterm, 3.5% of early term and 2% of term infants) were admitted to NICU. Anthropometric and thyroid function test results according to gestational age of the infants are given in **Tab. 1**. Factors that affect NICU admission according to gestational age of the infants are given in **Tab. 2**.

CONCLUSIONS

Gestational age and male gender play a role in NICU admission in late preterm and term infants. T4 levels affect NICU admission in late preterm infants, and TSH is the only factor in term infants.

**Table 1 (ABS 5).** Anthropometric and thyroid function test results according to gestational age of the infants.

| | | Birth weight (g) [a] | Gestational age (weeks)[a] | T4 (µg/dl) mean ± SD [a] | TSH (µIU/ml) median (25-75p) [b] | C/S n (%)[a] | Male n (%) [a] |
|---|---|---|---|---|---|---|---|
| Late preterm | NICU n = 216 | 2,479 ± 464 | 35.1 ± 0.8 | 11.6 ± 2.3 | 6 (3.7-10.3) | 191 (88.4) | 128 (59.3) |
| | Control n = 521 | 2,673 ± 412 | 35.7 ± 0.6 | 12.8 ± 2.2 | 5.7 (3.5-8.9) | 452 (86.8) | 244 (46.8) |
| | p | < 0.001 | < 0.001 | < 0.001 | 0.11 | 0.53 | 0.002 |
| Early term | NICU n = 116 | 3,162 ± 576 | 37.6 ± 0.5 | 12.7 ± 2.3 | 6.2 (3.7-10) | 100 (86.2) | 79 (68.1) |
| | Control n = 3,302 | 3,252 ± 419 | 37.8 ± 0.4 | 13.2 ± 2.2 | 5.6 (3.4-8.9) | 2,796 (84.7) | 1,711 (51.8) |
| | p | 0.026 | < 0.001 | 0.015 | 0.1 | 0.65 | 0.001 |
| Term | NICU n = 72 | 3,471 ± 438 | 39.5 ± 0.6 | 13.9 ± 2.9 | 9.9 (4.9-14.3) | 54 (75) | 44 (61.1) |
| | Control n = 3,512 | 3,466 ± 388 | 39.5 ± 0.6 | 13.6 ± 2.2 | 5.6 (3.4-8.9) | 2,285 (65) | 1,729 (49.2) |
| | p | 0.91 | 0.88 | 0.36 | < 0.001 | 0.08 | 0.046 |
| All infants | NICU n = 404 | 2,852 ± 643 | 36.6 ± 1.9 | 12.3 ± 2.6 | 6.2 (3.9-11.1) | 345 (85.4) | 251 (62.1) |
| | Control n = 7,335 | 3,289 ± 476 | 38.4 ± 1.3 | 13.3 ± 2.2 | 5.6 (3.4-9) | 5,533 (75.4) | 3,684 (50.2) |
| | p | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |

[a]Student's t test is used, $p < 0.05$ is statistically significant.
[b]Mann-Whitney U test is used, $p < 0.05$ is statistically significant.

**Table 2 (ABS 5).** Factors that affect NICU admission according to gestational age of the infants.

| | Late preterm | | Early term | | Term | | All infants | |
|---|---|---|---|---|---|---|---|---|
| | RR (95% CI) | p | RR (95% CI) | p | RR (95% CI) | p | RR (95% CI) | p |
| Gestational age | 0.29 (0.23-0.37) | < 0.001 | 0.34 (0.23-0.48) | < 0.001 | 1.04 (0.72-1.49) | 0.85 | 0.42 (0.39-0.46) | < 0.001 |
| Male infant | 1.7 (1.18-2.45) | 0.004 | 1.95 (1.31-2.92) | 0.001 | 1.5 (0.9-2.46) | 0.09 | 1.65 (1.32-2.07) | < 0.001 |
| T4 | 0.78 (0.72-0.85) | < 0.001 | 0.9 (0.83-0.99) | 0.27 | 1.06 (0.96-1.18) | 0.27 | 0.89 (0.85-0.94) | < 0.001 |
| TSH | 1.03 (1-1.07) | 0.4 | 1.04 (1.01-1.07) | 0.007 | 1.08 (1.05-1.11) | < 0.001 | 1.05 (1.03-1.07) | < 0.001 |

## ABS 6

## IMPROVING THE QUALITY OF PROLONGED JAUNDICE WORK-UPS IN THE OUTPATIENT DEPARTMENT IN A TERTIARY NEONATAL CENTRE

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### BACKGROUND AND AIMS

Prolonged jaundice and the resulting investigations were common in the Pediatric Outpatient Department (POPD) and an audit completed January 2015 demonstrated the workload resulting from this as well and questionable adherence to NICE guidelines. Reaudit was undertaken to reassess adherence to NICE guidelines after interventions were performed.

### METHODS

Compliance with NICE and BSPGHAN guidelines was audited in October 2014 and results demonstrated some deficiencies in the completeness of work-up in babies with prolonged jaundice. A proforma was designed and its use was encouraged with educational sessions for involved members of staff. The audit loop was closed with reaudit in March 2016. Cases for audit were identified by interrogating the laboratory system and chart review was undertaken. Results were analysed using Microsoft® Excel®.

**Table 1 (ABS 6).** Quality of prolonged jaundice work-ups in a Pediatric Outpatient Department. Adherence to NICE guidelines before and after intervention.

| Parameter | Audit | Reaudit | Difference |
|---|---|---|---|
| **Urine colour** | 3% (n = 1) | 52% (n = 23) | +49% |
| **Stool colour** | 11% (n = 4) | 54% (n = 24) | +43% |
| **NBSS** | 78% (n = 29) | 73% (n = 32) | -5% |
| **Urine culture** | 81% (n = 30) | 86% (n = 38) | +5% |
| **LFTs** | 90% (n = 33) | 100% (n = 44) | +10% |
| **FBC** | 90% (n = 33) | 96% (n = 42) | +6% |
| **Blood group DCT** | 84% (n = 31) | 91% (n = 40) | +7% |
| **TFTs** | 97% (n = 36) | 98% (n = 43) | +1% |

NBSS: newborn blood spot screening; LFTs: liver function tests; FBC: full blood count; DCT: direct Coombs test; TFTs: thyroid function tests.

RESULTS

A total of 81 cases were analysed, 37 prior to the intervention and 44 after the intervention. The actual proforma was found in 47% of charts after the intervention (**Tab. 1**).

CONCLUSIONS

The intervention (education and proforma) improved quality of investigations for prolonged jaundice and can ensure that all babies investigated for prolonged jaundice are investigated according with standards.

## ABS 7

## SAVE THE DATE? CORRECT RECORDING OF DAY OF LIFE AND CORRECTED GESTATIONAL AGE IN NICU

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BACKGROUND

Anecdotal reports from medical and nursing staff demonstrated anomalies in recording of neonates' day of life (DOL) and corrected gestational age (CGA). Many decisions are made based on these ages – medications started and discontinued, vaccinations given and discharge continued. Mistakes can carry over and so correct and accurate recording of DOL and CGA is important.

AIMS

This audit aims to assess the accuracy of DOL and CGA recording.

METHODS

This was a retrospective observational audit. A convenience sample of ten medical records of premature babies was selected, as DOL and CGA are most relevant in these babies. A proforma was created to collect the recorded DOL and CGA and the date from the chart. Only anonymous data was collected. Data was analysed in Microsoft® Excel®. The standard is 100% accuracy.

RESULTS

There were ten infant charts reviewed as part of the audit. There were a total of 531 bed days in total analysed (mean per patient of 53, median 48, range 31-99). All patient charts had some errors. No charts were completely accurate.

DOL: the highest error was 3 days greater than accurate DOL.

CGA: the highest error was 11 days less than accurate CGA. The median and mode of the error was zero days, with the mean error 0.32 days less than the accurate CGA.

CONCLUSIONS

No charts were completely correct. As medical records are a legal document this is unacceptable and steps to improve this will be taken.

## ABS 8

## PARENTS IN NICU: THE IMPORTANCE OF INTEGRATION BETWEEN THE CURE AND THE CARE

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INTRODUCTION

Parental access in Neonatal Intensive Care Units (NICU) has always been limited due to the risk of infections and possible interference with patient care. In recent years, Family Integrated Care (FIC) has increasingly been implemented, allowing parents of newborns hospitalized in NICU to be admitted with fewer restrictions in visiting times. The objective was to assess the level of satisfaction associated with parental stress. We also analyzed the weight gain of newborns with or without parental care, the possible increase in nosocomial infections, and we considered the opinion of health workers.

METHODS

We conducted an observational study by randomly recruiting 48 parents and their children. The first

24 families (cases) were granted access in NICU with fewer restrictions and limitation in time; they also took part in assisting the newborn babies. The remaining 24 families (controls) were allowed access to NICU for one hour a day, without the possibility of assistance. Both groups completed a questionnaire to assess stress and satisfaction. To evaluate the effectiveness of the FIC, weight, CRP and days of antibiotic and antifungal therapy were detected in infants of both groups. Moreover, a sample of 23 health workers completed a questionnaire to assess opinions about the FIC model.

RESULTS

Our study showed that parents in the FIC group were more satisfied ($p < 0.05$) and less stressed ($p < 0.05$) compared to the controls. Infants in the FIC group showed an increase in weight ($p < 0.05$) and a decrease of nosocomial infections ($p < 0.05$) compared to the controls. 68% of healthcare workers considered that parental presence improved their knowledge on childcare, while 64% believed that the FIC model created more stress for the healthcare team.

CONCLUSIONS

This study showed that implementation of the FIC model is favorable and less stressful for the family. Moreover, infants showed a significant increase in weight and reduction of nosocomial infections compared to babies in the control group. Data analysis showed that healthcare workers are the obstacles to the implementation of FIC model. In fact, although they believe that family presence improves the understanding about infant care, they think parent's presence is stressful in NICU.

## ABS 9

## THE PREVALENCE OF HEREDITARY HEARING LOSS IN 41,152 NEWBORNS DURING THE PERIOD 2011-2015

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INTRODUCTION

Sensorineural hearing loss (HL) is one of the most frequent clinical features in newborns caused by GJB2 gene, SLC26A4 gene, OTOF gene and mitochondrial DNA mutations in Asia regions. The hearing loss caused by these genes mutations is usually congenital in onset, moderate to profound in degree, and non-progressive. The objective of this study was to establish a newborn screening program in Taiwan.

METHODS

We developed a highly sensitive, specific and rapid assay for c.109G>A of the GJB2 gene, c.235delC of the GJB2 gene, c.919-2A>G and c.2168A>G of the SLC26A4 gene, c.5098G>C of OTOF gene and mitochondrial m.1555A>G of the 12S rRNA gene analyses from dried blood spots. The newborn genetic screening tests were performed using polymerase chain reaction (PCR) assay with fluorescence resonance energy transfer (FRET) hybridization probes in a real-time PCR detection system. During the period 2011 to 2015, this study analyzed 41,152 newborns in Taiwan.

RESULTS

Newborn genetic testing was performed on 41,152 individuals, and 8,183 (19.88%) babies were found to carry at least 1 mutated allele. A total of 597 newborns (1.45%) carried either homozygous, compound heterozygous or homoplasmic mutations in targeted gene. These children could potentially have hearing loss. In particular, 417 (1.02%) of them were homozygous for GJB2 c.109 G>A, 7 (0.02%) were homozygous for GJB2 c.235delG, 7 (0.02%) were homozygous for SLC26A4 c.919-2A>G, 1 was homozygous for OTOF c.5098 G>C, 45 (0.11%) were compound heterozygous for GJB2 c.109 G>A and c.235delC, and 116 (0.28%) were homoplasmic or heteroplasmic for m.1555A>G in 12SrRNA gene.

CONCLUSIONS

Newborns with hearing loss need early diagnosis for treatment and prevention. Newborn screening for sensorineural hearing loss enables early detection and management of this genetic disease.

## ABS 10

## DEFICIENCY OF MULTIPLE acyl-CoA DEHYDROGENASE OR GLUTARIC ACIDURIA TYPE II

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INTRODUCTION

The deficiency of multiple acyl-CoA dehydrogenase, or glutaric aciduria type II, is a condition affecting the oxidation of fatty acids and amino acids. The autosomal recessive inheritance is caused by mutations in genes ETF-A, ETF-B, and ETF-DH, encoding the alpha and beta subunits of the electron transfer flavoprotein (ETF), and ETF-coenzyme Q-oxidoreductase. It is a rare disease, presenting with a clinically heterogeneous phenotype, ranging from serious consequences such as neonatal death during the first weeks of life, to a mild disease of childhood or adulthood with intermittent episodes of metabolic decompensation.

CASE REPORT

We present two cases of severe neonatal form confirmed by genetic diagnosis. Both newborns had metabolic acidosis, hyperammonemia, hypoglycemia and hypotonia since the first hours of life; the first case presented multiple organ failure and irreversible brain damage from birth and the limitation of therapeutic efforts was decided together with the family after seven days of life. Peculiarly, the second case presented injuries at neuroimaging that were consistent with glutaric aciduria type I. The newborn was stable in the supportive care unit until ten weeks of life, when he presented metabolic decompensation in the context of respiratory infection, with respiratory and progressive neurological impairment. Comfort measures were taken and the patient died. Brain imaging is presented in **Fig. 1A** and **Fig. 1B**.

CONCLUSIONS

Glutaric aciduria type II is a rare life-threatening disease. Treatment is supported by a diet rich in carbohydrates, fats, proteins, and restrictive supplementation of altered enzyme cofactors. The importance of the diagnostic confirmation in relation to genetic counseling should also be noted.

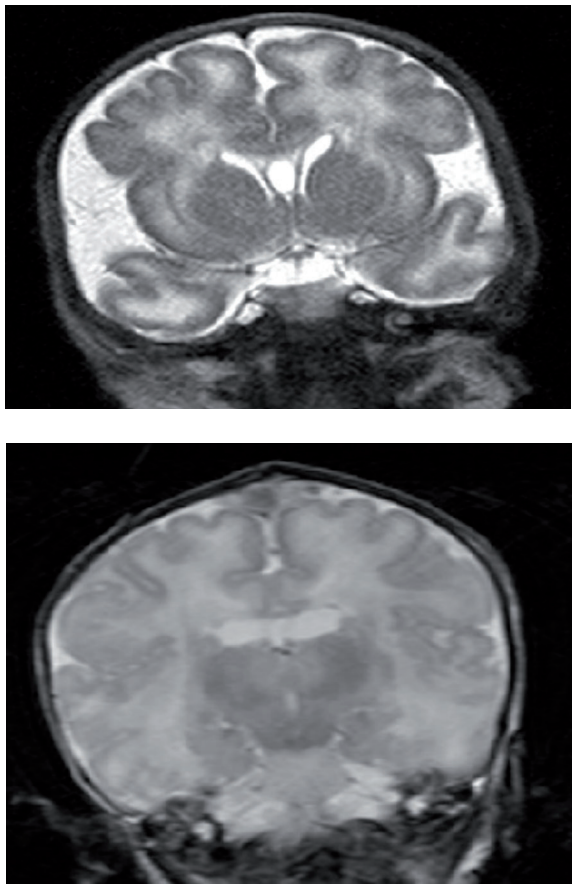


**Figure 1 (ABS 10).** Brain imaging in a case of deficiency of multiple acyl-CoA dehydrogenase, or glutaric aciduria type II.

## ABS 11

## TEN YEARS OF EXPERIENCE IN CARRIER SCREENING FOR SPINAL MUSCULAR ATROPHY IN TAIWAN

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INTRODUCTION

Spinal muscular atrophy (SMA) is an autosomal recessive neuromuscular disorder with an overall incidence of 1 in 10,000 live births and a carrier frequency of 1 in 35 to 1 in 50. Approximately 94% of SMA cases are caused by the common homozygous absence of the SMN1 gene. Routine testing for SMA is recommended because of the high carrier frequency and the severity of this genetic disease.

METHODS

During a 10-year period, we performed a screening panel for SMA in Taiwan. We used denaturing high-performance liquid chromatography (DHPLC) and multiplex ligation-dependent probe amplification (MLPA) as tools to test the SMN1 gene heterozygosity in pregnant women. If both partners were SMA carriers, a prenatal diagnosis was offered.

RESULTS

Between 2005 and 2014, of the 139,404 pregnancies that were screened in Taiwan, we identified 2,859

individuals that had only one copy of the SMN1 allele (SMA carrier), giving a carrier frequency of 1 in 49 (2.05%) in our population. There were 2,504 partners or spouses who accepted the carrier testing, and 58 couples were at high risk for having offspring with SMA. Prenatal diagnoses by amniocentesis or Chorionic villus sampling (CVS) were provided in 49 pregnancies, and 13 (22.41%) fetuses were diagnosed with SMA. The prevalence of SMA in our population was 1 in 10,723. Of these 13 fetuses, five of (38.46%) were at risk for asymptomatic or mild SMA, while the remaining eight fetuses (61.54%) were at risk for severe SMA. Couples decided to terminate the pregnancies in 12 of 13 affected pregnancies (92.31%), based on informed decisions in addition to genetic counseling.

CONCLUSIONS

The main benefit of this program of SMA carrier screening was to reduce the burden of birth of an affected child. Additionally, we determined carrier frequency and genetic risk in our population, while providing genetic services and counseling for carrier couples.

## ABS 12

## REDUCING MEDICATION ERRORS ON THE NEONATAL UNIT – A MULTIMODALITY APPROACH

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INTRODUCTION

Medication errors are significantly more frequent in neonatology (up to 15% of admissions) when compared to adult medicine. The reported error rate varies between 5-24 per 1,000 patient care days. The causes for neonatal medication errors are multifactorial, including non-availability of smaller dosing formulations, age and weight dependent dosing, limitations of electronic prescribing and varying doses quoted in different formularies. Medication errors were the single largest group of patient safety incidents reported on our neonatal unit. Though the majority of the errors were near misses or lead to minimal harm, medication errors have the potential to cause catastrophic harm to vulnerable infants. Hence a multidisciplinary team was constituted at the beginning of 2015 to put in place measures to reduce medication errors on the neonatal unit.

METHODS

The team: the members of the team included 2 neonatal consultants, representatives from specialist neonatologists, representatives from neonatal nursing, 2 pharmacists, a pharmacy manager, nurse educators and an electronics applications specialist. The following interventions and innovations were introduced:

1. a customized and concise neonatal formulary for the most commonly used and high risk drugs was developed. The information for each drug included specific details for prescribing, dispensing and administering;
2. the prescription options on the electronic prescription system was aligned to the data in the formulary;
3. developing data, validating and updating the database on the Guardrails system on smart pumps for injectable drugs to align with formulary and data on the electronic prescribing system;
4. implementing the bedside electronic patient identification system on NICU;
5. a well coordinated launch with dissemination of information and bedside training for all of the above.

RESULTS

The reported medication errors dropped from a peak of 34/1,000 patient days in early 2015 to 6.6/1,000 patient days by December 2015.

CONCLUSIONS

A coordinated multidisciplinary/multipronged approach has resulted in a significant improvement in the reported medication errors on the neonatal unit.

## ABS 13

## NEONATAL DEATH NOT ARISING FROM PRETERM BIRTH IN A HIGH COMPLEXITY HEALTHCARE UNIT

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INTRODUCTION

The complications related to premature birth are a well-know cause of neonatal death, which primarily affects extremely preterm infants. Nevertheless, the causes and circumstances of neonatal death have scarcely been studied in term or late preterm newborns.

AIMS
To examine the causes and manner of death, together with certain characteristics of the dying process, in neonatal deaths not arising from prematurity in our NICU.
METHODS
Retrospective study. The study group included patients deceased within the period January 2009-December 2015, older than 33 weeks gestational age (GA). Variables registered were the following: GA, weight, origin, sex, age, moment of death, main pathology, death cause, manner of death and characteristics of the dying process: application or not of limitation of therapeutic effort (LTE), criterion and type of LTE, accompaniment, consent autopsy and organs donation.
RESULTS
During the period there were 4,741 admissions and 256 deceased; of these, 171 were > 33 wGA. The average GA was 37.7 w (33-44). 64.3% of patients were older than 36.6 w. The average weight was 2,776 g (1,340-4,795), 56.8% were males. 42.5% were outside admissions. The average age at the moment of death was 12.3 days. Congenital malformations was the most frequent cause of death: 104/171, followed by hypoxic-ischemic encephalopathy (HIE): 40/171. The predominant malformations were: diaphragmatic hernia (32), sever congenital hearth disease (31), and multiple malformation syndromes and/or chromosome abnormalities (21). Most of the patients died after LTE in 70.2% of cases. This LTE was settled in 62.1% of the deceased with congenital malformation and in 95% of the deceased with HIE. The types of LTE were withdrawing life-support in 73.2% of cases and withholding new treatments or failing to resuscitate in 26.8% of cases. In 85% of cases, the parents accompanied their children in the dying process. Autopsy was granted in 65.4% of cases.
CONCLUSIONS
The 2 most significant groups of newborns > 33 wGA who die during admission to NICU are serious congenital malformations and severe HIE. The majority of newborns die after LTE, predominantly after life support is withdrawn. Most patients die accompanied by their parents.

## ABS 14

## IMPROVING EFFICIENCY AND QUALITY OF NEONATAL CLINICAL RECORDS

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INTRODUCTION
It was noted on a ward round with the new team for the week (consultant, registrar & Senior House Officer – SHO) that it was difficult to identify which investigations (and their results) and specialist reviews had occurred with each patient. To improve efficiency on ward rounds and patient safety we felt an investigation summary sheet in all neonatal notes would be beneficial.
METHODS
A 10-question survey was devised using SurveyMonkey® exploring the opinions of the medical team on current practice for recording investigations and results in the clinical notes and whether they felt that a summary sheet would be useful. We sought their opinion on what they felt should be included on the summary sheet. The link to the survey was sent to all consultants and Pediatric trainees working in the neonatal unit.
RESULTS
The survey was sent to 22 members of medical staff with a 2-week time limit to respond. We had a 68% response rate to the survey. 73% of respondents felt there was no easy to identify problem list in the notes and 93% felt that it was not easy to identify speciality reviews in the notes. With regards to identifying radiology investigation's and results, 13% and 66.6% felt these were easy to identify respectively. With regards to specialist blood tests and results, only 6% and 13% felt these were easily identifiable. 100% of respondents felt that there could be a better way of recording speciality reviews and investigations in the notes and 100% felt that it would be beneficial to have a summary sheet in the notes. The majority of respondents felt that the summary sheet should include a problem list, investigations, specialist blood tests and specialist reviews.
CONCLUSIONS
This survey highlighted that all medical staff felt that a summary sheet would be useful in all clinical notes to highlight the problems, investigations to date and specialist reviews. This information will guide the development of a summary sheet, which we will audit after implementation.

## ABS 15

## VACTERL ASSOCIATIONS: WHEN SHOULD PEDIATRICIANS THINK ABOUT THEM?

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## INTRODUCTION

VACTERL association is an acronym to indicate vertebral defects, anal atresia, cardiac defects, tracheoesophageal (TE) fistula, renal anomalies, and limb defects.

## CASE REPORT

We report 3 cases of VACTERL association.

## RESULTS

### *Case 1*

A 2,830-g male infant was born vaginally at 35 weeks gestational age (WG). Physical examination revealed no gross dysmorphic features, except for an imperforate anus without perineal fistula and limb defects with clubbed feet, clinodactyly. A chest X-ray confirmed esophageal atresia, while the spine was normal. Echocardiography showed septal ventricular defect. VACTERL association was diagnosed.

### *Case 2*

A female baby was born at 37 WG, gravida 3, para 3. Prenatal sonography had shown hydramnios and dilated esophagus, while the stomach was not visible. Physical examination of the neonate revealed an imperforate anus with perineal fistula, tracheoesophageal (TE) fistula and radial axis involvement. Echocardiography showed situs ambiguous with levocardia. The neonate was operated on the fourth day of life for esophageal and anus atresia. She died within few hours after surgery due to heart failure.

### *Case 3*

A 950-g female infant was born at 31 WG. Prenatal sonography had shown the following findings: severe intrauterine growth restriction (IUGR), manifest hydramnios, not visible stomach, hydrocephalus, renal pelvic dilation and limb defects. Amniocentesis and cytogenetic analysis revealed a karyotype of 47, XX, +18. The infant presented perinatal asphyxia. Physical examination confirmed prenatal conclusions. The skeletal survey revealed hemivertebrae and block in the lumbar vertebrae, with rachischisis. Based on the presence of vertebral segmentation defect, imperforate anus, and absence of any features suggestive of alternative diagnosis, the infant was diagnosed for VACTERL association.

## CONCLUSIONS

Just as there are challenges in defining VACTERL association for a neonate, the diagnosis can be problematic. Missing manifestations may render the diagnosis more difficult to achieve.

**ABS 16**

## JEUNE ASPHYXIATING THORACIC DYSTROPHY: A CASE REPORT

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## INTRODUCTION

Jeune syndrome (asphyxiating thoracic dystrophy 1, ATD1) is a rare, autosomal recessively inherited skeletal dysplasia with an estimated incidence of 1-5/500,000 live births, with a wide spectrum of severity and occurrence of non-skeletal complications. We report the case of a newborn with Jeune syndrome.

## CASE REPORT

A.R., a 1,400 g male infant born to a first degree consanguineous marriage, was delivered at $31^{+4}$ weeks gestational age by cesarean section. The mother was 27-year-old (gravida 1, para 1). Routine fetal ultrasound screenings at 12 and 24 weeks gestation were unremarkable. He presented to our NICU with birth asphyxia and respiratory distress, with multiple characteristic skeletal anomalies including small bell shaped thorax and short limbs without polydactyly. X-ray showed a shortening of the ribs, hypoplastic iliac wings, horizontal acetabular roofs with spur-like projections at lower margins of sciatic notches and early ossification of capital femoral epiphyses. Ulnae and fibulae were relatively short, with cone-shaped epiphyses. The patient had conjugated hyperbilirubinemia with prolonged jaundice. Ultrasonography of the abdomen was normal. Hematological examination, hepatic, renal functions and serum calcium and phosphorus levels were normal. Ophthalmological examination showed no retinal anomaly. The newborn was examined by a neonatologist and a geneticist. The diagnosis of ATD1 was proposed. Unfortunately, the molecular study could not be performed in our county. The newborn died at day 15 of life with a severe respiratory distress due to the rigid and reduced thoracic cage.

CONCLUSIONS
Asphyxiating thoracic dystrophy is a rare recessive autosomal disease showing wide phenotype variability. It is often fatal in the first year of life. Together with its wide clinical variability, it should be taken into account in the genetic counseling of families with ATD1.

## ABS 17

## PERSISTENT CLOACA IN A FEMALE NEWBORN

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INTRODUCTION
Persistent cloaca is a complex, congenital disorder in which rectum, vagina, and urinary tract meet and fuse, creating a cloaca. Normally the rectum, genital tract and urinary tract would have separate outlets. Cloacal anomalies occur in 1/20,000 females. The etiology of persistent cloaca is unknown. Cloacal malformation can be suspected prenatally on routine ultrasound, which may show bilateral hydronephrosis. The bladder may not be very clear on the scan and there may also be a cyst-like swelling in the abdomen. After birth, diagnosis of cloaca should be suspected in a female with an imperforate anus and small looking genitalia. Physical examination will confirm the diagnosis. Cloacal anomalies require expert surgical care by a multidisciplinary team of surgeons. Special focus is given to separating the rectum, vagina and urethra while maintaining urinary control, bowel functioning, and preserving sexual and reproductive capacity.
CASE REPORT
A 34-year-old nullipara delivered a female neonate at 39/40 weeks of gestation, with birth weight of 3,320 g, birth length 48 cm, Apgar score 10/10. On the first clinical examination the newborn had proper clinical status, but no anal opening was present, with external female genitals less differentiated compared to normality. Ultrasound examination found residues of mucus in the vagina and completely emptying bladder with no signs of hydronephrosis, and demonstrated the atretic rectum. Suspecting a persistent cloaca, the newborn was referred to the pediatric surgeon where she was monitored in a multidisciplinary way by pediatric surgeon, a nephrologist and a children's gynecologist.
CONCLUSIONS
The diagnosis can be made prenatally, but it is more often made after birth. Children with mild anomalies will have excellent bladder control and normal sexual development, fertility and function. Children with more severe anomalies may need life-long bladder and bowel intervention. The goal of the treatment of a female born with cloaca is to achieve bowel control, urinary control, and sexual function.

## ABS 18

## LATE CORD CLAMPING IN INFANTS OF DIABETIC MOTHERS

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INTRODUCTION
We aim to determine the early post-natal effects of late cord clamping time on infants of diabetic mothers (IDM) and large for gestational age (LGA) babies.
METHODS
Term or early term IDM and LGA babies with birth weight of over 4,000 grams were included in the study. Fifty newborns were randomly allocated to two groups: group 1, the early cord clamping group (cord was clamped within 15 seconds); group 2, the late cord clamping group (cord was clamped at 60 seconds or more). Data including demographic features, APGAR scores, cord blood gas pH and lactate values, 4th hour hematocrit, 4th and 24th hour bilirubin levels, duration of hospital stay and neonatal intensive care unit (NICU) admission were recorded.
RESULTS
No statistically significant differences were found between early and late cord clamping groups, except for birth weight ($p = 0.049$). No statistically significant differences were found in blood pH and lactate levels between the groups ($p = 0.37$, $p = 0.21$). Postnatal hematocrit values and bilirubin levels were not significantly different between the two

groups (p = 0.703). Six infants (group 1: 3 babies; group 2: 3 babies) had polycythemia, however these infants were asymptomatic and no treatment was needed. One baby in the late cord clamping group with hyperbilirubinemia needed phototherapy. Three babies in the late cord clamping group needed NICU admission for transient tachypnea of neonate. This difference was not statistically significant (p = 0.235).

CONCLUSIONS

IDMs are at high risk for low iron stores, however late cord clamping is avoided in this group in routine practice because of the risk of early postnatal complications. This group of babies may benefit from late cord clamping. In our study, late cord clamping in IDM and LGA babies did not result in postnatal complications. Before this practice can be routinely recommended, large randomized controlled trials including long-term prognosis are needed.

## ABS 19

## STRESS BIOMARKERS IN HEALTHY PREGNANT WOMEN WITH PREVIOUS TRAUMAS

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INTRODUCTION

Trauma history is a health-threatening condition in pregnant women. In fact, it can affect the biological pathways involved in the response to stress, such as the hypothalamic-pituitary-adrenal axis (HPA) and the sympathetic-adrenal-medullary axis (SAM), even in the fetus. Therefore, cortisol and α-amylase salivary levels could be associated with previous traumas. However, while some findings suggested that childhood trauma entails hyperactivity of the HPA axis, other studies observed an increase in α-amylase but not in cortisol levels.

METHODS

A reliable analytical method based on Ultra High-Performance Liquid Chromatography coupled to tandem mass spectrometry was used to determine cortisol in saliva samples from healthy mothers with and without previous traumas (n = 40 and 59, respectively) and their newborns at different time points: (i) 38 weeks of gestation (T1), (ii) 48 h after birth (T2), and (iii) 3 months after birth (T3). The two groups of mothers (with and without previous traumas) and their newborns were studied at T1, T2, and T3 for any statistical differences in cortisol levels.

RESULTS

We observed significant differences in salivary cortisol between mothers with and without previous traumas at T1 ($p < 0.001$) and at T2 ($p = 0.005$). Furthermore, mothers who obtained higher scores in post-traumatic symptoms showed higher cortisol levels at T1 ($R = 0.285$, $p = 0.004$). However, both groups showed similar α-amylase levels, regardless of trauma history. Finally, cortisol levels as well as α-amylase levels did not show any significant differences in the two groups of newborns.

CONCLUSIONS

Cortisol levels are an indicator of previous traumas in pregnant women, which may affect maternal stress both in the prenatal and postnatal period. We conclude that this analytical method is a useful tool for further clinical research on prenatal and post-birth stress, such as threatened preterm labor and/or parenting stress, respectively.

## ABS 20

## ASSESSING PARENTING SELF-EFFICACY BEFORE AND AFTER APPLYING A SPECIFIC TRAINING PROGRAM FOR PARENTS (CAPPREM: PRETERM CAPACITATION) DURING HOSPITALIZATION OF PRETERM NEONATES

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INTRODUCTION

In a hospital environment, initial parenting in a family with a preterm neonate will be very different from expected. This unusual and stressful situation may determine the self-confidence perceived by mothers and fathers in caring for the newborn, and it could therefore shape future interaction with the baby, as well as the

**Table 1 (ABS 20).** Demographic data.

| Characteristics | M | 95% CI | Min | Max |
|---|---|---|---|---|
| Gestational age (weeks) | 29.667 | 28.366-30.967 | 27.4 | 32 |
| Birth weight (g) | 1,098.89 | 933.74-1,264.04 | 890 | 1,460 |
| Maternal age (years) | 32.33 | 29-35.66 | 26 | 39 |
| Paternal age (years) | 33.25 | 29.94-36.56 | 29 | 41 |

**Table 2 (ABS 20).** Perceived Maternal Parenting Self-Efficacy (PMP S-E) tool score stratified in its subscales, before and after the training program.

| | M | 95% CI | p |
|---|---|---|---|
| PMP S-E bf | 39.86 | 34.16-45.55 | |
| CTP | 7.79 | 5.88-9.70 | |
| EB | 14.35 | 12.45-16.26 | |
| RB | 9.71 | 8.22-11.21 | |
| SB | 7.93 | 6.64-9.22 | |
| PMP S-E af | 69.64 | 65.48-73.80 | |
| CTP | 13.42 | 11.94-14.90 | |
| EB | 24.50 | 22.28-26.71 | |
| RB | 20.37 | 18.82-22.32 | |
| SB | 11.14 | 19.64-11.64 | |
| PMP S-E af-bf | | | .003 |
| CTP af-bf | | | .001 |
| EB af-bf | | | .001 |
| RB af-bf | | | .001 |
| SB af-bf | | | .001 |

CTP: care taking procedures (4-16 points); EB: evoking behavior(s) (6-24 points); RB: reading behavior(s)/signals (7-28 points); SB: situational beliefs (3-12 points); PMP S-E bf: Perceived Maternal Parenting Self-Efficacy before training program; PMP S-E af: Perceived Maternal Parenting Self-Efficacy after training program.

neurodevelopmental and behavioral development of preterm infants.

24/7 neonatal units allow parents to stay with their baby whenever they want, but this free access does not guarantee nor encourage parenting self-efficacy, unless going hand in hand with a specific training program for parents.

OBJECTIVE

To assess parenting self-efficacy before and after the application of a specific training program (CAP-PREM) for parents of hospitalized preterm neonates.

METHODS

Longitudinal, prospective, analytic cohort study of preterm newborns whose parents received a specific training program to care for their preterm newborns during hospitalization. Families were recruited during the first 10 days of hospitalization. The Perceived Maternal Parenting Self-Efficacy (PMP S-E) tool developed by Barnes and Adamson-Macedo, was used to measure self-efficacy in providing infant care by the mother, or both mother and father. The training program was developed at bedside by nurses and neonatologists and covered theoretical and practical sessions during the first 25 days of hospitalization. Inclusion criteria were preterm infants between 25 and 32 weeks of gestation, parents stay at the unit for at least 8 hours/day during training program and fluent Spanish. Exclusion criteria were clinical instability, invasive mechanical ventilation, intraventricular hemorrhage > II, necrotizing enterocolitis.

RESULTS

9 families (10 preterm) were recruited from June 2015 to May 2016. **Tab. 1** shows demographic data and **Tab. 2** reports the PMP S-E tool score stratified in its subscales before and after the training program.

CONCLUSIONS

Self-confidence is quite low in parents of preterm newborns. Involving parents in caring for their preterm newborns from the first days of life could improve their perceptions as parents and strengthen the interaction with their babies. An individualized and specific training program at bedside is needed to specially support the weakest aspects of care.

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## ABS 21

## MANAGEMENT OF ERROR DURING DRUG THERAPY

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INTRODUCTION
The most frequent errors in the hospital setting in neonatology are those related to drugs. Errors can occur during routine drug prescription, drug dilution, drug administration and during emergency drug therapy. To avoid errors, we implemented some organizational changes, such as the creation of an integrated unified therapy logbook shared by nurses and doctors. The integrated logbook requires both the signature of the prescribing doctor and of the administering nurse. Another important tool to achieve reduction of drug related errors was reporting any drug related adverse events and near miss events.
METHODS
Our goal was to evaluate the positive effect of sanitary staff training performed to introduce the unified therapy logbook, and of the report of the adverse and near miss events. We performed an evaluation of the reported adverse events. We also performed random controls on the therapy logbook and a root cause analysis to verify if compilation was correct and to improve any shortcomings.
RESULTS
The unified therapy logbook allowed decreasing transcription-related errors. The signature of the prescribing doctor and of the administering nurse empowered both figures, even though it was not possible to completely eliminate errors. Nevertheless, after these interventions, reported errors were intercepted before they occurred (near miss events) in the majority of cases.
CONCLUSIONS
The integrated therapy logbook introduced in our hospital achieved the goal of increasing collaboration between medical and nurse staff, with the aim to improve patient's safety.

## ABS 22

## MULTIDISCIPLINARY SIMULATION TRAININGS FOR IMPROVED MANAGEMENT OF NEONATAL EMERGENCIES

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INTRODUCTION
A significant number of perinatal complications is caused by teamwork and communication failures. Multidisciplinary simulation is a tool for the improvement of healthcare workers collaboration. West-Tallinn Central Hospital (WTCH) Woman's Clinic, with 3,500 childbirths per year, is the second largest center in Estonia and the only one with a practicing Pelgulinna Simulation Center (PSC). Since 2013 we provide monthly *in situ* simulation trainings for multidisciplinary teams. In the first year of activity, 36 teams of medical workers were trained and now we carry out similar trainings in other 7 hospitals in Estonia.
METHODS
After 1.5 years of regular trainings, we conducted a survey aiming to determine the effectiveness of our activity. Data was collected with anonymous workers' subjective self-assessment questionnaire of trainings efficacy in clinical procedures and teamwork, frequency and quality. Respondents were randomly selected. 53 employees from PLC WTCH Woman's Clinic participated: midwives 44.4% (23); obstetricians 18.9% (10); nurses 15.1% (8); anesthesiologists 9.4% (5); pediatricians 5.7% (3); residents 3.8% (2); others 3.8% (2).
RESULTS
49% of employees who participated three or more times to trainings estimated that they improved in teamwork. 50% of workers who participated only one time estimated that changes in the teamwork were significant. Only 7.1% of workers who participated just once evaluated the efficiency on clinical work at minimum level, while 83% of those who participated three or more times estimated the experiences very useful for clinical practice. Employees estimated a greater benefit on clinical practice ($M = 4.74$; $SD = 0.66$) than on teamwork improvement ($M = 4.29$; $SD = 0.92$) and the difference is statistically significant $t(52) = 52.65$; $p < 0.001$.
CONCLUSIONS
The conclusion is that employees have a positive perception about improved teamwork in neonatal resuscitation by multidisciplinary *in situ* simulation trainings after multiple participations.

## ABS 23

## NEONATAL MARFAN SYNDROME

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## INTRODUCTION

Marfan syndrome is rarely diagnosed in the neonatal period because of the variable expression and age-dependent appearance of clinical signs and symptoms. The prognosis is usually poor, due to high probability of congestive heart failure, mitral and tricuspid regurgitations with suboptimal response to medical therapy and difficulties in surgical management.

## CASE REPORT

The authors studied two cases of Marfan syndrome in the newborn period. Both children were evaluated by echocardiography and the results were compared with control groups of 15 children. DNA marker studies were used to facilitate diagnosis in the second case with familiar occurrence.

## RESULTS

Marfan syndrome was diagnosed in two children based on the appearance of tall stature, thin body figure, long arms and legs, fingers and toes suggestive of Marfan syndrome. Cardiovascular abnormalities were diagnosed by echocardiography. In both cases the aortic root diameter was significantly different compared to the control group ($p \leq 0.01$, $p \leq 0.001$ and $p \leq 0.05$). Mitral regurgitation and mitral valve prolapse occurred in both children, while tricuspidal regurgitation was present in the second case only. In one case, genetic DNA analysis confirmed the mutations in the fibrillin-1 gene (*FBN1*) located on chromosome 15q21, responsible for the development of Marfan syndrome. The first child died at six weeks of age with signs of congestive heart failure and pneumonia. The second case was treated with atenolol and losartan and the clinical symptoms of congestive heart failure were mild. At the age of 4 years the congestive heart failure worsened due to the progression of mitral and tricuspid insufficiency, as well as the development of significant cardiomegaly. Therefore, surgical repair of mitral and tricuspid valves by valvuloplasty and partial reconstruction of aortic valve were carried out at 4 years of age. The girl recovered quickly after surgery with significant reduction of cardiomegaly. She is currently regularly followed-up by a pediatric cardiologist.

## CONCLUSIONS

We presented two cases of Marfan syndrome in newborn infants. In both cases we found a complete picture of Marfan syndrome. Marfan syndrome is an autosomal dominant genetic disorder with skeletal, cardiac and ocular involvement. Mutations in *FBN1* on chromosome 15 are responsible for the development of MFS. Gene cracking has a role in the early diagnosis of familiar Marfan syndrome. Early diagnosis of Marfan syndrome in the newborn period could help physicians to treat these kind of patients in the early stage of cardiovascular abnormalities and explain to the family the serious health problem of their child.

## ABS 24

## LONG-TERM AND SHORT-TERM EFFECTS OF PROPRANOLOL HYDROCHLORIDE TREATMENT ON NEWBORNS

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## INTRODUCTION

While propranolol hydrochloride (PH) is largely used for adult patients, its use in the neonatal period is progressively increasing. However, concerns over its reliability have increasingly been raised, particularly when PH is used in the treatment of premature newborns. Aiming to clarify these increasing concerns, our study is the first clinical one in the literature and was conducted in premature infants, the patient group most vulnerable to PH treatment.

## METHODS

We planned our study as double-blind, randomized, and case controlled. We included in the study 36 preterm newborns on PH treatment (0.5 mg/kg/6 h) beginning in the first post partum month and at least for one month (Propranolol Hydrochloride Group-PHC) and 40 preterm newborns on distilled water in place of PH (Control Group-CG). The gestational ages of all the infants in the study were below 31 weeks, and their birth weights were

**Table 1 (ABS 24).** Vital functions in preterm newborns.

| | CG (n = 40) median ± SD (%) | PHG (n = 36) median ± SD (%) | p-value |
|---|---|---|---|
| **Blood sugar values (mg/dl)** | 78.4 ± 12.5 | 65.6 ± 7.5 | **0.006** |
| **Number of patients with apnea** | 12 (30.0) | 12 (33.3) | 0.50 |
| **Respiratory rate (bpm)** | 47 ± 3 | 48 ± 2 | 0.39 |
| **Heart rate (bpm)** | 127 ± 7 | 124 ± 6 | 0.33 |
| **Systolic blood pressure (mmHg)** | 61.5 ± 3.0 | 60.0 ± 4.9 | 0.14 |
| **Diastolic blood pressure (mmHg)** | 39.0 ± 3.1 | 35.0 ± 4.6 | 0.20 |

CG: Control Group; PHG: Propranolol Hydrochloride Group.

below 1,500 g. The patients' vital functions and their physical developments were monitored and recorded in patient follow-up forms. In the period following PH treatment, patients were subjected to Ankara Developmental Screening Inventory (ADSI) and Denver Developmental Screening Test II (DDST-II) to study their mental development.

RESULTS

The initiation time and the duration of PH treatment for PHG patients in the study were determined to be 27.0 ± 2.7 day and 26.5 ± 8.7 day, respectively. Patients in the control group, however, received distilled water for similar durations. Statistically significant differences of blood sugar were detected between the CG (78.4 ± 12.5 mg/dl) and the PHG groups (65.6 ± 7.5 mg/dl) (p = 0.006, **Tab. 1**). However, no statistically significant difference was found between the CG and PHG groups in terms of physical and mental development (ADSI, DDST-II) (p > 0.05).

CONCLUSIONS

While in the short-term PH may have some temporary effects on the patients' vital functions, no serious effects were detected affecting long-term physical and mental development when used on preterm infants.

## ABS 25

## ACUTE LIVER FAILURE, A THERAPEUTIC CHALLENGE IN NEONATAL PERIOD

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INTRODUCTION

Acute liver failure is a rare but potentially devastating process that often leads to urgent liver transplantation when liver regeneration is believed to be unlikely. We report a neonatal case of acute liver failure which onset was immediately after birth.

CASE REPORT

A term newborn presented a petechial-macular rash few hours after birth. Blood tests were suggestive for acute liver failure. Infectious diseases screening was performed and antibiotic empirical therapy was started. A screening of the most frequent pathologies was done including gestational alloimmune liver disease (GALD) and routine abdominal ultrasound. At the age of 3 days, the clinical picture progressively worsened with high transaminases and important cholestasis. A supportive treatment of acute liver failure was started according to our unit protocol, keeping neurological status monitored as serial determinations of ammonia were performed without significant alterations during the first week of life. The first etiological hypothesis was a congenital CMV infection (PCR positive on blood test) and ganciclovir was started. Despite conventional medical treatment, coagulopathy and thrombocytopenia worsened, requiring multiple transfusions. Because of his unfavorable course according to the King's College Criteria, the value of V Factor and the ICG-PDR test, the patient was listed for emergency zero transplantation. Liver transplantation was carried out at 16 days of life. Additional testing finally revealed decreased values of bile acids in blood and urine, supporting the diagnosis of a congenital liver disease.

CONCLUSIONS

Neonatal liver failure is a very rare disorder that can have numerous possible causes. Early diagnosis

is critical for the best outcome. Supportive care, especially with the nutritional needs, is important for newborns with this kind of pathology. Alternatively, liver transplantation may be life saving. Nevertheless, predicting the evolution of the liver injury in neonates is still a challenge and makes the therapeutics strategy more difficult.

## ABS 26

## NEONATAL RESUSCITATION PROGRAM (NRP): RESULTS OF A SECONDARY HOSPITAL WITH 3 YEARS EXPERIENCE

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### INTRODUCTION

Approximately 10% of all newborns require resuscitation at birth and less than 1-2% need advanced resuscitation. These percentages are higher in the presence of any risk factor. Advanced resuscitation should be performed by experienced neonatologists. This does not happen at secondary hospitals due to lack of neonatologists. Attendance at the delivery room of neonatal nurses experienced in births and Neonatal Resuscitation Program (NRP) may improve neonatal outcomes and reduce morbidity and mortality. The NRP should include training courses and refreshing trainings aimed at general pediatricians, nurses and midwives.

### OBJECTIVE

To describe the incidence of advanced resuscitation at a level II hospital and compare with the literature.

### METHODS

A retrospective descriptive study based on the review of charts of all newborns between January 2012 and December 2014 in a level II hospital with a mean of 2,218 deliveries per year. Data was collected from the resuscitation form (Selene) and the percentage of staff (doctors, nurses and midwives) trained through the NRP.

### RESULTS

Between January 2012 and December 2014 there were a total of 6,655 live births (mean 2,218 live births/year). 90.4% were full-term newborns, 4.7% late preterm and 4.7% < 34 weeks gestation (GA 30 weeks [25-33 weeks]). 418 newborns (6.2%) needed resuscitation (mainly manual ventilation 389, 5.84%). Advanced resuscitation was needed by only 0.43% of newborns (29/6,656). 3,526 (53%) were deliveries without risk factors (initially assisted by neonatal nurses), 20 of which needed CPAP. 20 patients needed CPAP (0.5%) and 138 needed manual ventilations in the first minute of live. These resuscitations were effective because none of the newborns of this group required intubation or cardiac massage upon arrival of the pediatrician. During this period of time, 4 training courses on advanced neonatal resuscitation were performed (endorsed by SEN, "Sociedad Española de Neonatología"), training 88% pediatricians, not neonatologist, 88.2% neonatal nurses and 25% midwives. Quarterly retraining courses were provided aimed to pediatricians, with voluntary attendance by nurses.

### CONCLUSIONS

The percentage of advanced resuscitation in our hospital is in accord with previous reports in the scientific literature. We believe this is possible thanks to the NRP. The attendance of deliveries by neonatal nurses improves the results in NRP. In 158 cases, the nurse began advanced Neonatal Resuscitation while the newborn was attended by the pediatrician. In level II and III hospitals it is necessary to form the maximum number of people participating to neonatal NRP.

## ABS 27

## EVALUATION OF NEONATAL ATTENDANCE TO THE EMERGENCY SERVICE AFTER THE IMPLEMENTATION OF A PROTOCOL OF ON-GOING CARE BETWEEN HOSPITALIZATION AND PRIMARY CARE

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### INTRODUCTION

The transfer of newborn care from the hospital to primary care (PC) remains a weak point in assisting the newborn. It increases the risk of hospital admission for dehydration and jaundice. On the other side, parents use the emergency service to solve

**Table 1 (ABS 27).** Results before and after the creation of protocol of early referral (PER) and neonatal day hospital (NDH).

| | Number of deliveries | Number of emergency visits ≤ 28 days of life | Average age (in days) | 0-7 days | Achievable visits by primary care | Admissions from emergency room | Average emergency visits by patient |
|---|---|---|---|---|---|---|---|
| **2012 (before PER)** | 814 | 278 | 9.9 | 40.6% | 68% | 65 (23.3%) | 1.19 |
| **2013 (after PER)** | 740 | 258 | 8.5 | 50% | 60.9% | 36 (13.9%) | 1.72 |
| **2014 (after PER)** | 762 | 259 | 8.7 | 45% | 55.6% | 26 (10%) | 1.43 |
| **2015 (after NDH)** | 771 | 174 | 11.2 | 26% | 69% | 19 (10%) | 1.43 |

their doubts, thus increasing the risk of infectious diseases spreading. In 2012 we created a protocol of early referral (PER) to solve the problems of transfer to primary care. In 2015 the neonatal day hospital (NDH) was launched to repeat blood tests to the patients, thereby avoiding many emergency room visits.

OBJECTIVE

To evaluate the effectiveness of the creation of PER (2013) and NDH (2015) in decreasing the visits to emergency room and hospital admissions.

METHODS

A retrospective analytical study based on the review of medical charts of patients who visited the emergency department at a secondary hospital, with an average of 2.387 deliveries/year, between June-September 2012 (before PER), 2013, 2014 and 2015 (after NDH).

RESULTS

Results are presented in **Tab 1**. There was a gradual reduction of emergency visits, with an important decrease in 2015, mainly by infants younger than 7 days of life ($p < 0.001$). As many of them are sent out for control to primary care or to NDH, they don't come to the emergency service. The number of admissions falls from 23.3% to 10% ($p < 0.001$) especially admissions due to dehydration and jaundice. 60% of the patients consulted for diseases assumable by primary care: feeding problems (40%) and umbilical pathology (10%).

CONCLUSIONS

The creation of PER has improved the assistance of newborns, showing a decrease in the number of visits to the emergency service and in the secondary admissions to early perinatal pathologies ($p < 0.001$). In the last year, the initiation of NDH has significantly contributed to decrease the total visits of newborns (< 7 days of life) to the emergency department, aiming to avoid the consequences of their visit. It is necessary to create ongoing care programs that improve the assistance of high-risk patients.

## ABS 28

## RARE LOCATIONS OF CONGENITAL TERATOMA: A REPORT OF TWO CASES

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BACKGROUND

Congenital teratoma is a germ cell tumor frequently located in sacrococcygeal and gonadal sites. The aim of our study is to report rare locations of this benign tumor, which may be life-threatening like cervical and heart teratoma.

CASE REPORT

Two cases of teratoma were diagnosed in our Sfax Neonatology Department in the period from January 2012 to December 2015.

RESULTS

A female newborn presented with an anterolateral cervical mass without respiratory distress, although the mass increased in volume during the first 5 days. At MRI, the tumor was driving the carotid axis back, without laryngotracheal invasion. Complete surgical excision was performed and histological examination found an immature teratoma.

A male newborn was born at 34 weeks of gestation. A fetal thoracic mass was diagnosed one week before birth. He presented with severe respiratory distress. Echocardiography showed a large pericardial effusion with intra pericardial tumor. Tomography showed the presence of a pleural effusion. A pericardial drain was placed but quickly removed because of a pneumo-pericardium. The newborn condition was complicated by severe hemodynamic disturbances

and heart failure because of tamponade. He died 70 hours after birth. A post mortem pericardial biopsy revealed an immature teratoma.

CONCLUSIONS

Congenital teratomas are usually benign but some locations may worsen the prognosis. Commonly, cervical forms are severe because of airway compression. In one of our patients airway compression and respiratory distress were not present. Pericardial teratoma exposes to cardiac tamponade and heart failure. In our country, it is necessary to improve early *in utero* diagnosis, which sometimes allows antenatal drainage, facilitating the postnatal treatment.