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GENDER, PULMONARY MORBIDITY AND PERSISTENT HIGH CONCENTRATIONS OF WEAK FETAL ANDROGENS IN PRETERM INFANTS

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Background: In preterm infants (PIs), the activity of the fetal adrenal cortex continues until term. The fetal adrenal androgen dehydroepiandrosterone can block the synthesis of surfactant in cultured fetal lung tissue. The incidence of pulmonary disease is higher in male than in female PIs.

Aim: To investigate the relationship between urinary excretion of fetal steroids (FS: 3ß-OH-5-ene-steroids) and the severity of lung disease in PIs with respect to gender.

Methods: 30 female (median (interquartile-range) 28.0(26.6–28.7)wks) and 31 male PIs (27.0(25.9–28.6)wks) were included. FS were profiled by gas chromatography-mass spectrometry in 24-h urinary samples. Excretion rates of 15 metabolites were summed to calculate total excretion rates. Urine was collected non-invasively using cellulose nappies and extracted by hydraulic press.

Results: The incidence of respiratory distress syndrome (RDS) treated with surfactant in females was 47% and in males 71%, p=0.07. The incidence of BPD (FiO2 > 0.21 at day 28) was 27% in females and 48% in males, p=0.11. Medians of excretion rates of FS (mg/kg/d) in female (male) PIs were at day 1: 1.3 (0.9); day 2: 3.2 (7.7), p=0.03; day 3: 5.5 (9.5), p=0.08; day 5: 7.1 (10.4); week 2: 8.7 (9.7); week 3: 8.6 (10.1); week 4: 7.6 (7.8). Regression analysis revealed a slight but significant influence of the maximum excretion rates of glucocorticoids (OR=1.02, p=0.036) on the incidence of RDS treated with surfactant. The maximum excretion rates of FS or gender were not significant factors.

Conclusion: Excretion rates of FS were 4fold higher than previously reported indicating a persistent high activity of the fetal adrenal zone in PIs. Excretion rates of FS were significantly higher in male PIs compared to females at day 2 (trend at day 3) but had not a significant influence on the incidence of RDS. Supported by DFG grant (HE 3557/1–1) to M.H. and S.A.W.

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TRANSFORMING GROWTH FACTOR BETA 1 AND PROCOLLAGEN 1 N-PROPEPTIDE IN THE CSF OF NEONATES WITH SPINA BIFIDA APERTA DEVELOPING HYDROCEPHALUS

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Background: The pathogenesis of hydrocephalus in human neonates with spina bifida aperta (SBA) is incompletely understood. Cerebrospinal fluid (CSF) outflow obstruction or arachnoideal resorption deficit may play an important role in the development of ventriculomegaly. In animal model, overexpression of transforming growth factor beta 1 (TGF beta 1) or increased local collagen turnover in the CSF lead to tissue proliferation and CSF malabsorption.

Objective: To determine the relative contribution of CSF malabsorption and CSF obstruction in the development of hydrocephalus in SBA neonates.

Patients / Methods: The CSF concentration of the aminoterminal propeptide of type 1 collagen (PINP; immunoassay, Roche Diagnostics) and TGF beta 1 (ELISA, DPC Biermann) were assessed in 3 groups of neonates with congenital hydrocephalus. Group1: SBA (n=10); group 2: neonatal aqueduct stenosis (obstructive hydrocephalus (n=4)); group 3: fetal intracerbral hemorrhage (communicative hydrocephalus (n=4)). Interleukin-6 concentrations in the CSF (IL-6; ELISA, DPC Biermann) were determined in all samples to estimate the proinflammatory state.

Results: PINP concentrations in the CSF of group 1 (median: 180.5 ng/ml, range 90–809) were significantly lower when compared with group 3 (median: 1074, range 978-1194; p=0.002). No significant differences in PINP values were found between group 1/group 2 or group 2/group3. TGF beta 1 concentrations were found significantly lower in group 1 (median 103.5, range 78–675 pg/ml) compared with group 3 (median 277 pg/ml, range 129–414; p= 0.03). No significant differences in TGF beta 1 concentrations were found between group 1 vs. group 2 or group 2 vs. group 3. Median IL-6 CSF concentrations were found to be low in all patient groups.

Conclusions: Present data on CSF biomarkers strongly indicate that CSF obstruction contributes more to the development of hydrocephalus in SBA neonates than CSF malabsorption.

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FUNGAL COLONIZATION OF NEWBORN IN NEONATAL INTENSIVE CARE UNIT: A PROSPECTIVE STUDY

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Background. Invasive candidiasis in neonates has become an increasing problem over the past decade in Neonatal Intensive Care Units (NICUs) in the world; it is a relatively common cause of late onset sepsis associated with a high mortality. Risk factors are preterm babies who require invasive diagnostic and aggressive therapeutic procedures, prior antibiotic therapy, congenital abnormalities, gastrointestinal tract diseases, necrotizing enterocolitis and anatomical abnormalities requiring surgery. Prior colonization is the major risk factor for candidemia.

Methods. To determine the rate of colonization, risk factors and the possible modes of acquisition of Candida spp. in neonates in NICU, we conducted a prospective cohort study including 48 successive admissions at NICU of Pediatric University Hospital, Sarajevo, during 3 months. Samples (mucocutaneous swabs, urine, stool, blood) were obtained weekly until the time of discharge or death (one infant enrolled in the study exited). Care health worker hands were cultured weekly (55 samples).

Results. Candida spp. from various body sites samples were isolated in 7 patients (rate of colonization 14,8%) while 7 samples of health workers hands were positive for C. spp (14,5%). Patients colonizated or infected by Candida spp. in our study were or very preterm newborns (3/7) or compromised term newborns (4/7), with congenital abnormalities (2/7) or gastrointestinal surgical interventions (2/7). Two very preterm neonates were colonized early from the birth, which indicates possible vertical transmission. In other 5 patients, colonization occurred more lately, after at least 15 days stay in NICU, which indicates nosocomial transmission as a predominant mode of acquisition. Among 10 positive patterns from different body sites, Candida albicans was isolated in 6 cases; other 4 cases were C. glabrata (2/10), C. krusei (1/10) and C. famata (1/10).

Conclusions. Rather than focusing on methods of identifying of pregnant women with vaginal Candida colonization, attention should be directed to high risk neonates and infection control measures including hands washing by health care workers.

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CHILDHOOD MORTALITY RATES IN MYANMAR AND THE IMPACT OF HEALTH EDUCATION AND PREVENTION SCHEMES

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Background: Economic deterioration and military rule have had a negative impact on the health of the Burmese population. Previous data reported an infant mortality rate of as high as 105 per 1000 live births in 1996.

Aim: To review the development of mortality rates in neonates, infants and children in Myanmar during the past decade.

Methods: Data were retrieved from the Central Statistical Organization (CSO) of Myanmar, from UNICEF and from WHO. Data include the mortality under five years of age (U5MR), infant mortality rate (IMR), and neonatal mortality rate (NMR).

Results: During the 1990s U5MR was reported at 77/1000, IMR at 58/1000, and NMR at 37/1000. The latest report given by the CSO in 2002/2003 estimates U5MR at 66.1/1000, IMR at 49.7/1000, and NMR at 16.3/1000. Data published by the WHO in 2003 provide a less optimistic perspective: U5MR is reported at 107/1000, IMR at 76/1000, and NMR at 35/1000. The geographic distribution of mortality cases is remarkably uneven: 83% of all deaths occurred in rural areas. 73% of death cases under the age of five years occurred in the age group 0–11 months, 34% of infant death cases happened during the first month of life. The majority of death cases were attributable to acute respiratory infections, diarrhea, brain infections, or septicemia. Changes made between the two time points included the introduction of supplementation and immunization programs.

Conclusions: International sources (UNICEF, WHO) indicate a less fortunate situation related to childhood mortality rates in Myanmar as is published by the CSO. Although mortality rates have been declining compared to the 1996 data, progress appears less expeditious as medically and politically desired. Further substantial reductions of mortality rates require structural changes in order to compensate for the much higher incidences of U5MR, IMR, and NMR in rural areas.

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IDENTIFICATION OF ACTIONABLE ITEMS FOR SYSTEMS IMPROVEMENT THROUGH PATIENT SAFETY EXECUTIVE WALKROUNDS IN A PEDIATRIC HOSPITAL (USA)

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Background: This institution is participating in a multi-center quality improvement initiative, Executive Walkrounds (EW), designed to provide hospital staff with a forum to communicate safety concerns to leadership. We developed a method to transform these concerns into actions and facilitate follow-up.

Objective: To use comments elicited during EW to identify themes and actionable items in order to resolve safety concerns.

Design/Methods: The Children's Hospital Executive Walkrounds Team (EWT) visited a different unit in a large pediatric teaching hospital for 1 hour, 3 times per month. Three rotating executives conducted semi-structured interviews with staff including physicians, nurses, and pharmacists, using standardized questions. To identify themes and actionable items, staff comments were recorded verbatim and entered into a database. Comments were coded by 2 observers into thematically distinct categories, and summarized in an Action Plan (AP) - a tool for ensuring follow-up of actionable items. One week later, a Debrief session with unit leaders was convened to discuss items in the AP, determine actionability, and assign responsibility for resolving the item. 12 weeks later, participating staff received feedback and progress-to-date in the form of the updated AP. Each comment was then labeled completed or in progress.

Results: 550 multidisciplinary staff participated in 27 EW. Attendance ranged from 8–47 (mean 12) staff per round. Of 384 items, 14 distinct categories were identified by 2 observers with 90% agreement rate. The top themes were: Workload/Resources (89% of EW), Communication (78%), and Information Systems (63%). Pediatric-specific concerns were present in 15% of the comments. In 12 APs fed back to date, 82% of items were actionable and 32% of these actionable items were completed.

Conclusions: Concerns regarding workload, resources and communication were identified frequently by staff as impacting patient safety. Actionable items were identified and addressed through the AP. One third of the items were resolved comprehensively.

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NON-CYSTIC WHITE MATTER DAMAGE IN ELGA INFANTS – A SWEDISH POPULATION BASED STUDY

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Aim/ subject: Magnetic resonance imaging (MRI) has contributed to the understanding of brain damage in infants with extremely low gestational age (ELGA, <27w). Data from Scandinavia, which has a long tradition of minimal intervention in the treatment of preterm infants, have not been reported yet. In this abstract we present the first results of an ongoing population based MRI study performed in the Stockholm area of Sweden.

Methods: All ELGA infants born in the Stockholm area in 2004 (n=51; birth weight: mean 770g, range 465 - 1114g; gestational age: mean 25+2w, range 23+2 - 26+6w) were included. Perinatal data and clinical courses were prospectively collected. At term equivalent age infants were scanned with conventional MRI using a 1.5 Tesla magnetic resonance system (Philips Intera). Images were reviewed by 3 independent observers using a scoring system for grey and white matter abnormalities (Inder et al 2003).

Results: 33 infants (birth weight: mean 805g (range 554 - 1114g); mean GA 25+4w (range 23+5 - 26+6w) were included in the analysis. Out of 51, 10 had died before term age, in 2 no parental consent was obtained, one was excluded because of chromosomal disorder, 2 because of connatal CMV infection, 1 moved outside Sweden, 2 have not reached term age yet. Normal white matter (WM) was found in 21%, mild WM abnormalities in 58%, moderate to severe non-cystic WM abnormalities in 21%, cystic WM abnormalities in none. GM scores were normal in 90% and abnormal in 10%.

Conclusion: Cystic WM damage was not seen in any infant. Non-cystic white matter abnormalities were found in 79% and abnormal grey matter in 10% of our ELGA infant population. To evaluate the clinical relevance of these findings neurological follow-up of these children is ongoing.

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