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### FATTY ACID COMPOSITION OF HUMAN MILK IN A PORTUGUESE URBAN POPULATION:PROSPECTIVE STUDY FROM 7 DAYS TO 16 WEEKS OF LACTATION

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Fat in human milk varies during a feed, during the day and throughout the period of lactation. Fatty acid (FA) composition varies over the course of the day and during lactation.

**Aim**: To evaluate FA composition in human milk, from 7 days (transitional milk) to 16 weeks of lactation (mature milk) and to assess the composition stability of these FA throughout this period. Methods: Mothers living in urban area of Porto who accepted to participate in the study were selected according to inclusion criteria (healthy term newborn exclusively breast-feeding). Pooled human milk was collected from all feedings over 24 hours at the following times: 7 days and 4, 8, 12 and 16 weeks of lactation. FA were analysed through capillary gas chromatography. Comparisons were made (Oneway ANOVA). Correlations between FA were made through Pearson and Spearman correlation coefficient.

**Results**: 31 mothers completed the follow-up period. Total saturated fatty acids (SFA) progressively increased from 40.50 ± 3.72 (% wt/wt) at 7th day up to 43.08 ± 4.61 at the 16th week of lactation, whereas total monounsaturated fatty acid decreased from 33.04 ± 2.58 (% wt/wt) to 31.48 ± 3.32, in the same period. Arachidonic acid (AA) markedly decreases with the stage of lactation. Docosahexaenoic acid (DHA) content decreases lightly from the 7th day to the 4th week of lactation, remaining stable throughout the rest of the lactation period. No significant correlation was found between the levels of linonleic and a-linolenic acid, and their long-chain metabolites AA and DHA.

**Conclusions**: Despite fluctuations in the contents of AA and DHA, the ratio AA/DHA did not significantly change throughout the period of lactation. The ratio AA/DHA remained constant during the study, suggesting a protective mechanism, as AA and DHA are essential structural components of all tissues and particularly of retina and neuronal tissues.

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### RESPIRATORY SYMPTOMS AND ATOPY IN CHILDREN WITH BRONCHOPULMONARY DYSPLASIA

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Prematurely born children are known to have more respiratory symptoms during their first years of life than children born full-term, particularly in those children who had bronchopulmonary dysplasia (BPD). Thus BPD is considered a risk factor for children wheezing and asthma. The predisposition to atopy of children born preterm can be assumed to differ from that of children born at term.

**Aim**: to evaluate the respiratory symptoms and the frequency of atopy in children with bronchopulmonary dysplasia, at school age.

**Material and Methods**: 45 children with BPD (Shennan criteria) were included: (M/F: 34/11); mean gestational age: 29,4 weeks (range 24–34); mean birth weight 1205 grams (range 570-1900). Thirty children were evaluated at 4 years of life. Respiratory symptoms and laboratory evaluation were collected. Total and specific IgE (inhaled and food antigens) determinations were done. BPD was defined by oxygen dependence at 36 weeks post conceptional age. Atopy was considered when a positive result of either specific IgE test was obtained.

**Results**: 22/30 (73%) children presented with respiratory symptoms during the first 2 years of life. Seven patients at 4 years of life had recurrent wheezing. Atopy (specific IgE positive) was seen in 10/30 (33,3%) children and 5/10 (50%) patients had family history of atopy. At school age all patients were free of respiratory symptoms. Prick tests were realised in 36 children and were positive in 4/36 (11%) cases. These 4 cases have been identified by specific IgE at preschool age.

**Conclusion**: this study shows that 1) In patients with BPD The respiratory symptoms improve in the first few years of life; 2) The frequency of atopy in BPD patients is similar to the general population in our country; 3) Neonatal respiratory events remain probably the strongest predictor of respiratory symptoms in these patients.

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### EFFECT OF MATERNAL MAGNESIUM SULFATE ADMINISTRATION ON BAND 3 PHOSPHORYLATION IN ERYTHROCYTES OF PRETERM NEWBORNS

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Magnesium sulfate is widely used as treatment for imminent eclampsia or to prevent preterm labor. Its use for the purpose of neuroprotection in preemies is controversial. We evaluated whether they might also have an effect on function of the erythrocytes. The aim of the presented study was to compare the selected erythrocyte membrane parameters including ATP concentration, the band 3 (prominent transmembrane protein of erythrocytes)amount, and phosphotyrosine content in erythrocyte membranes of preterm newborn whose mothers were treated or untreated with magnesium sulfate. The study group consist of preterm neonates (n-15) prenatally exposed to magnesium sulphate. Mean GA was 29,1 weeks (range 26–34) and mean birth weight was 1331g (range 650-1950). Control group included 20 infants (without prenatal Mg2+ administration). Mean gestational age was 30,78 weeks (range 26–34) and mean birth weight was 1392g (range 800-1800). In both groups, blood from umbilical cord vein was collected with citrate and than erythrocyte ghost were prepared. After birth, ATP concentration in erythrocytes of treated group was lower by 24% in relation to the control one (1.27± 0.44 mmol/g Hb) but after 24h we observed similar level in both groups (1.02±0.12 vs 1.09±0.19). The band 3 amount determined using the specific antibody was significantly decreased (50%) in magnesium-treated newborns during the studied period. However, after birth we observed the same phosphotyrosine level in both groups. P-Tyr amount was unchanged in magnesium-treated newborns after 24h of life, whereas increased by 20% in the control group. The presence of MgATP complex is necessary for a proper functioning of protein kinases. The administration of magnesium sulfate could intensify the phosphorylation of band 3 by tyrosine kinases thus increasing the glycolysis in erythrocytes. Supported by the grants No. 5P05E 09224 from the State Committee for Scientific Research, and No. 503 from the MU of Lodz.

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### QUALITATIVE ANALYSIS OF ARTEFACTS ON RAW EEG AND THE INFLUENCE ON AEEG CLASSIFICATION

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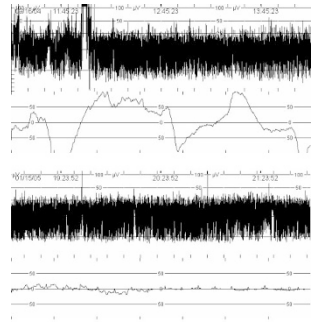
**Background**: In infants with neonatal encephalopathy (NE) the amplitude-integrated electroencephalogram (aEEG) has been used to both predict outcome and select infants for neuroprotection, based on a simple aEEG classification (1). Recently, digital aEEG monitors, which record and store a raw single channel EEG in addition to aEEG, have been developed.

**Aims**: To assess (i) the source of aEEG artefacts; and (ii) determine how the underlying raw EEG modulates the aEEG in a representative group of infants with NE.



**Methods**: 50 hours of aEEG and the underlying raw EEG (CFM 6000 Olympic Medical, USA) from 5 term infants with NE were retrospectively analysed and inspected for the source and duration of artefacts. Movement artefacts were defined as sudden alterations in the aEEG trace or rapid irregular low voltage distortion of the EEG without discernible EEG characteristics (Fig.1). Electrical artefacts were defined if electrocardiogram interference was observed on the raw EEG (Fig.2).

**Results**: Raw EEG artefacts were observed during 21% of the recording period. 76% of the artefacts were due to movement (muscle shivering, gasping or ventilation) and 24% of the artefacts were due to electrical interference. Sudden movement artefacts could be mistaken for seizures; repetitive movements caused either widening of the trace or raised the lower margin of the aEEG trace. Electrical interference from the ECG raised the lower margin of the aEEG trace.

**Conclusion**: aEEG artefacts were common during this representative period. Without knowledge of the raw underlying EEG, both movement and electrical artefacts may lead to misclassification of the aEEG. It is essential to scrutinise the underlying raw EEG to detect artefacts; this should improve the accuracy of aEEG classification and enhance the use of aEEG for determining prognosis in NE. 1. alNaqueeb et al., Pediatrics 1999;103:1263–1271 Fig.1:Sudden alteration of aEEG trace (arrow), movement artefact seen on EEG Fig.2:Alteration of aEEG due to electrical interference (arrow)

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### COMPARISON OF AEEG CLASSIFICATION WITH THE UNDERLYING SINGLE CHANNEL RAW EEG BACKGROUND ACTIVITY IN NEONTAL ENCEPHALOPATHY

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**Background**: The amplitude-integrated electroencephalogram (aEEG) is increasingly used in neonatal units. A simple aEEG classification has been shown to be predictive for neurodevelopmental outcome after neonatal encephalopathy (NE) and has been used to select infants for studies of neuroprotective therapy. New equipment has been developed with the possibility of combining the aEEG with the continuous EEG. Aim: To compare an aEEG classification with the underlying raw single channel EEG activity in NE.

**Subjects and Methods**: The aEEG was recorded for median 61 (IQR 36–95) hours in 8 term infants with NE using a digital aEEG monitor (CFM 6000 Olympic Medical, USA). The aEEG was classified as normal, moderately abnormal or severely suppressed according to the voltage of the lower and upper margin of the trace (1). The EEG was classified as continuous, moderately discontinuous (interburst interval <20 seconds), severely discontinuous (interburst interval 20–40 seconds) and extremely discontinuous (interburst interval >40 seconds) (2). 10 hours of each aEEG classification were assessed (total 30 hours). Traces with high impedance were excluded.

**Results**: Normal aEEG records showed continuous EEG activity throughout the recordings. In the moderately abnormal aEEG group, the underlying EEG was moderately discontinuous for 97% and severely discontinuous for 3% of the recordings, and the median interburst interval was 4 (IQR 3–6) seconds. In the severely suppressed aEEG records, the underlying EEG was extremely discontinuous for 83%, severely discontinuous for 9% and moderately discontinuous for 8% of the recordings, and the median interburst interval was 20 (IQR 10–49) seconds, significantly longer than in the moderate aEEG group ($p=0.008$).

**Conclusion**: A good correlation of the aEEG classification with the underlying EEG was shown. Combining assessment of aEEG and the degree of discontinuity of the underlying EEG may further refine the prognostic accuracy of aEEG. 1. al Naqueeb et al., Pediatrics 1999;103:1262–1271 2. Bagioni et al., Pediatrics 2001, 107(3):461–463