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AGE DEPENDENT CHANGES OF THE PERIPHERAL OXYGENATION IN HEALTHY TERM NEONATES

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Aim: Aim of the present study was to analyse the influence of postnatal age on peripheral oxygenation in healthy term neonates during the first week of life.

Methods: Peripheral oxygenation was measured by means of near infrared spectroscopy (NIRS) in combination with the venous occlusion method. Measurements were performed by placing the NIRS optodes on the left forearm. Venous occlusions were obtained by a pneumatic cuff around the left upper arm. Central and peripheral temperatures were measured continuously, as well as by means of pulsoximetry heart rate and peripheral arterial oxygen saturation were measured continuously. Arterial blood pressure was measured before and after venous occlusions. Oxygen delivery (DO2), oxygen consumption (VO2), fractional oxygen extraction (FOE), and tissue oxygenation index (TOI) were analysed and compared to postnatal age.

Results: 131 measurements were performed in 90 term neonates. Gestational age was 39,5+/-1,1 weeks, birth weight 3364+/-435 g, and postnatal age 46+/-33 hours. Peripheral arterial oxygen saturation was 96,3+/-1,8 %, heart rate 114+/-11 /minute, mean arterial blood pressure 54,4+/-6,8 mmHg, central temperature 37+/-0,3 degree Celsius, and peripheral temperature 34,3+/-1 degree Celsius. DO2 was 140+/-74 μmol/100ml/minute, VO2 46+/-23 μmol/100ml/minute, FOE 0,34+/-0,11 and TOI 65+/-6. DO2 was independent of age. VO2 and FOE increased with increasing age, whereas TOI decreased with increasing age.

Conclusion: The present study in term neonates demonstrated changes in peripheral oxygenation in healthy term neonates during the first week of life. Reason for this observation seems to be changes in the peripheral muscular oxygen consumption.

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PATTERNS OF CHANGE IN FAMILY FUNCTION, RESOURCES, COPING AND PARENTAL DISTRESS IN MOTHERS AND FATHERS OF SICK NEWBORNS OVER THE FIRST YEAR OF LIFE

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Background: Families of high risk infants are more likely to experience family dysfunction. Little is known about the pattern of family function, resources, coping and distress over time. Objective: To determine the pattern of change in family function, resources, coping and distress, as reported independently by mothers and fathers, over the first year following the birth of a sick newborn; and to determine the relationship among them.

Design/Methods: Longitudinal design. Participants: 200 two-parent families of infants who required intensive care at birth were recruited from a regional tertiary centre. Information was obtained through well validated questionnaires at 4 points: in the NICU, and at 3, 6, and 12 months (mo) post-discharge. Of the 200 families recruited, there were 44 (22%) drop-outs over the length of the study; and 4 had incomplete data for a final sample of 152. Data analyses were based on analysis of variance with repeated measures.

Results: Most changes occurred in the time period from NICU to 3 mo: 1) both mothers and fathers showed a significant decline in family function ($p<.0001$); 2) mothers showed a significant decrease in resources ($p=.03$); and 3) both mothers and fathers showed a significant decrease in distress scores ($p<.0001$). With respect to the relationship between family function and three independent variables (family coping, resources and distress), there were significant interactions for fathers between time and resources (($p<.0001$). There was only one significant change from 3 to 6 mo: fathers showed an increase in resources ($p=.04$).

Conclusions: This study demonstrated a significant change in the pattern of family function, resources and distress for both mothers and fathers in the first year following the birth of a sick newborn, with all but one change occurring from NICU to 3 mo. The relationships between family function, and resources and coping were complicated by interaction effects with time.

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COMPARISON OF MATERNAL HEALTH & BURDEN OF ILLNESS IN FAMILIES OF ELBW & NORMAL BIRTH WEIGHT (NBW) SUBJECTS AT YOUNG ADULTHOOD

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Background: At adolescence, the work and family life of extremely low birth weight (ELBW) subjects were comparable to a normal birth weight (NBW) reference group. Little is known, however, about the impact on families during the transition to adulthood or the long term effect on the health of the parents.

Objective: To compare maternal health and burden of illness on families of ELBW and NBW subjects at young adulthood (YA). Design/Methods: Longitudinal cohort study. Participants: At YA, 130/161 ELBW (81%) and 127/141 NBW (90%) mothers completed questionnaires. Information was obtained through well validated questionnaires and other study questionnaires.

Results: There were no significant differences in scores between groups in marital disharmony, mood, state anxiety, social support, depression, family dysfunction or mothers' physical or mental health (SF36). Within both the ELBW and NBW groups, there were no differences in the above measures between mothers of YA with and without impairments. The impact scores, however, revealed that statistically more mothers of ELBW subjects were negativey affected with respect to their jobs or training opportunities and those of their partners. Mothers of ELBW subjects also reported that the experience of caring for their child brought the family closer together, and that relatives and friends were more helpful and understanding. When families with subjects who had neurosensory impairments were excluded from this analysis, the effects on jobs or training was minimal.

Conclusions: By YA, it appears that apart from a negative impact on their jobs, in comparison to NBW subjects' families, there is little residual impact of having an ELBW child. The negative impact on jobs, however, was reported as being 'in the past' as opposed to 'now.' These results attest to the remarkable resilience of parents.

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THE INFLUENCE OF EMPIRICAL ANTIFUNGAL THERAPY ON NEONATAL CANDIDEMIA

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Background: Incidence and mortality of neonatal Candida sepsis are high in NICU patients.

Objective: To evaluate the efficacy of an empirical antifungal therapy guideline in reducing proven Candida infection incidence and mortality.

Methods: Incidence and mortality of proven Candida infection were analyzed during five years in our NICU; period 1: antifungal therapy with no institutional guideline (01/2000 to 06/2002), period 2: empirical antifungal therapy guideline (07/2002 to 12/2004). Guideline indicates use of amphotericin B in patients that fulfilled the following criteria: a.birth weight <1500 grams or very sick newborn, b.clinical signs of infection and/or neutropenia and/or hyperglycemia difficult to be treated, c.use of large spectrum antibiotics >seven days; associated to one of the following: total parenteral nutrition, mechanical ventilation, post-natal corticosteroid therapy , use of H2 blocker, mucocutaneous candidiase. Blood and CSF cultures were collected before starting therapy. Statistical analysis was t test, chi-square test, Fischer exact test, and Mann-Whitney test. The study was approved by our Institutional Committee on Ethics. There is no conflict of interest .

Results: Total number of admissions was 3178 (1607 in period 1 and 1571 in period 2). 72 (4.4%) were treated in period 1, and 77 (4.9%) in period 2 ($p=0.63$) Eighteen (1.1%) had positive blood culture for Candida in period 1, and 6 (0.4%) in period 2 ($p=0.027$). There were no significant statistical differences between newborns with Candida infection in both periods in gestational age, birth weight, number of patients with total parenteral nutrition, large spectrum antibiotic therapy, post-natal corticosteroids, H2 blockers, central catheters, major congenital malformations, or surgery. Eleven newborns (61%) died due to Candida infection in period 1, and none in period 2 ($p=0.016$).

Conclusions: Use of an empirical therapy guideline based on risk factors for fungal infection decreases the incidence and mortality of proven Candida sepsis in NICU patients.

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EARLIER DISCHARGE FOR MODERATELY PREMATURE INFANTS AT KAISER PERMANENTE IN CALIFORNIA

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Objective: To compare gestational age at discharge between infants born at 30 to 34 6/7 weeks gestational age who were admitted to neonatal intensive care units (NICUs) in California, Massachusetts and the United Kingdom (UK).

Design: Prospective observational cohort study.

Setting: 54 UK, 5 California and 5 Massachusetts NICUs.

Subjects: 4359 infants who survived to discharge home following admission to a NICU.

Main outcome measures: Gestational age at discharge home

Results: The mean (standard deviation) postmenstrual age at discharge of the infants in California, Massachusetts and the UK were 35.9 (1.3), 36.3 (1.3), and 36.3 (1.9) weeks, respectively ($p=0.001$). Compared to the UK, adjusted discharge of infants occurred 3.9 (95% CI 1.4, 6.5) days earlier in California, and 0.9 (95% CI -1.2, 3.0) days earlier in Massachusetts.

Conclusions: Infants of 30 to 34 6/7 weeks gestation at birth admitted and cared for in the hospitals in California have a shorter length of stay compared to those in Massachusetts and the UK. We speculate that certain characteristics of the integrated healthcare approach pursued by the health maintenance organization of the NICUs in California may foster earlier discharge. The California system may provide opportunities for identifying practices for reducing the length of stay of moderately premature infants in Massachusetts and the UK.

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OXYGEN VARIABILITY, ADHERENCE TO OXYGEN SATURATION TARGETS AND CHRONIC LUNG DISEASE

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Background: High blood oxygen tensions and oxygen tension variability have been linked to morbidity in preterm infants. Oxygen saturation (SpO2) monitoring is commonly used to guide oxygen therapy but appropriate target levels remain uncertain.

Aim: To determine whether SpO2 variability and/or time saturated above 94% while in supplemental oxygen are risk factors for the development of chronic lung disease (CLD) defined as the requirement for supplemental oxygen at 36 weeks.

Method: 94 infants who were born at less than 29 weeks gestation and survived to 36 weeks during the period October 2002 to January 2005 at the Simpson in Edinburgh, were studied. SpO2 values were downloaded every second to a computer from the time of admission until monitoring was discontinued. For the first 2 weeks of life, SpO2 variability (Standard Deviation of SpO2), fraction of time saturated above 94% (our units upper SpO2 target) while in supplemental oxygen, mean SpO2, mean fraction of inspired oxygen, and mean time spent in oxygen were calculated for each infant. Multiple logistic regression (MLR) was used to examine the relationship between these indices (plus gestation and weight) and the requirement for supplemental oxygen at 36 weeks.

Results: Seven infants were excluded because of early transfer out of the intensive care unit. Data from 87 infants was analysed. After artefact removal, saturation data was available for 84% of the total time. 49 infants were still in oxygen at 36 weeks CGA. SpO2 variability in the first week of life and fraction of time saturated above 94% while in supplemental oxygen in the first two weeks of life were independent risk factors for CLD after controlling for other factors ($p= 0.028$, and 0.040 respectively).

Conclusions: Strategies aimed at limiting the morbidity associated with oxygen administration should consider SpO2 variability, and adherence to SpO2 targets as well as the absolute SpO2 target.