fetuses during January 2012 in Policlinico Abano Terme, Abano Terme, Italy. Cord arterial blood gas parameters and hematocrit (Htc) were compared to the reference values obtained in 50 healthy, control neonates, matched for gestational age, vaginally delivered by 'one-step' approach. Data analysis was performed with SPSS for Windows statistical package (version 13).

Results In our study population, head-to-body interval was timed and was always inferior to 3 minutes. The groups had similar demographic and biomedical characteristics at baseline. The mean cord artery hematocrit (Hct 50.2 vs. 44.9; p<0.001) levels were significantly higher in the head-to-body interval 'two-step' approach group, but there was no significant difference in the umbilical artery pH (7.30 vs. 7.29; p=0.45).

Conclusion Head-to-body delivery by 'two-step' approach increases the red cell mass in term infants and does not increase the risk of neonatal academia.

19 LATE CORD-CLAMPING IMPROVES CIRCULATION IN NEONATES

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Aim was to investigate the effects of late vs. early cord clamping on systemic circulation cerebral blood flow velocity (CBFV) in prematures infants < 1500g in a randomized trial.

Subjects 35 neonates were studied 4 hours after caesarean section. In 19 neonates (birth weight: 1140±240g; gestational age: 29.0±2 wks) the umbilical cords were clamped after 30 seconds and the infants were placed 30 cm below placenta level (LCC), and in 16 (1180±270g; 28.6±2 wks) the cords were clamped immediately (ECC).

Methods MBP (mmHg), left ventricular output (LVO, ml/kg/min), mean cerebral blood flow velocity (CBFV) in the Arteria carotis interna (ACI, m/s; Doppler), hemoglobin (Hb, g/dl), and hematocrit (Hct, %) were measured. Systemic and cerebral hemoglobin transport (HbT), systemic vascular resistance (SVR; mmHg/kg/min^{-1}) were estimated. Statistic: *unpaared t-test.

Abstract 19 Table 1

Results	ECC	LCC	p-value
MBP	34±3	45±7	0.03
LVO	229±44	258±36	ns
ACA	0.15±0.03	0.21±0.05	ns
SVR	123±40	145±30	0.05
Hct	0.44±0.4	0.56±0.5	0.002
cerebral HbT	7.4±1.8	11.1±4.1	0.04
systemic HbT	154±27	181±24	0.05

Conclusions Late cord clamping improves blood pressure, systemic vascular resistance, hemoglobin, systemic and cerebral hemoglobin transport. The ECC group required more volume expansion in the first 24 h (ECC: 12/16, 14±7ml/kg; LCC: 6/19, 5±4ml/kg; p<0.03).

20 DELAYED VERSUS EARLY UMBILICAL CORD CLAMPING: DEVELOPMENTAL OUTCOMES AT 4 MONTHS IN SWEDISH INFANTS

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Background Delayed cord clamping is associated with increased neonatal hemoglobin levels, and improved iron status in infants at 4–6 months. There are no previous studies evaluating effects from timing of clamping on development in term infants.

Objective Does the time for umbilical cord clamping affect psychomotor development evaluated with Ages and Stages Questionnaire (ASQ) in 4-month infants?

Design/methods Randomized controlled trial investigating effect of delayed cord clamping (≥180 sec, DCC) versus early cord clamping (≤10 sec, ECC) in 382 full-term normal deliveries. After 4 months, parents reported their infant's development by the ASQ.

Results 365 (96%) questionnaires were returned. The mean total ASQ score did not differ between groups. The DCC group had a higher mean score (SD) in the domain problem solving, 55.3 (7.2) vs. 53.5 (8.2), p=0.03 and a lower score in personal-social; 49.5 (9.3) vs. 51.8 (8.1), p=0.01. There were no difference between the DCC and ECC groups concerning the frequency of infants under cut-off score (table).

Abstract 20 Table 1

	DCC n(%)	ECC n(%)	p
Communication < 33.3	4 (2.2)	4 (2.2)	1.0
Gross motor < 40.1	17 (9.2)	19 (10.6)	0.7
Fine motor < 27.5	6 (3.2)	12 (6.7)	0.15
Problem solving < 35	3 (1.6)	7 (3.9)	0.21
Personal-social < 33	8 (4.3)	8 (4.4)	1.0

Infants below cut off score in ASQ domains at 4 mo

Conclusions There was no overall effect of DCC on neurodevelopment assessed at 4 months of age. The possible effects on the domains will be further investigated in a follow-up study.

21 DELAYED CORD CLAMPING IN PRETERM INFANTS (< 32 WEEKS OF GESTATION): CURRENT CLINICAL PRACTICE IN THE UNITED KINGDOM

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Background Resuscitation guidelines recommend delayed cord clamping in term infants and this practice is being widely adopted in the UK. But there are no clear recommendations for early or delayed cord clamping in preterm infants.

Aims and objectives To find out the current UK clinical practice in early or delayed cord clamping in the preterm infants.

Study Design and methods Questionnaire based study carried out via internet tool (SurveyMonkey) followed by telephone interview from non-responders. Questionnaire completed by consultants, registrars or senior neonatal sisters (band 6 and above).

Results 100% response rate from all the 222 units providing neonatal care in the UK. Currently 24% units (52 of 222 units) delay cord clamping or practice other means to facilitate placental transfusion in preterm infants while 63% units have early cord clamping practice and no response from 8% units.

46% (24 of 52 units) delay cord clamping for 31–60 seconds, 17% delay for < 30 seconds, 14% delay for 61–120 seconds and 2% delay for 121–180 seconds. 8% units (4 of 52 units) practise cord milking to facilitate placental transfusion while 13% provided other means of facilitating placental transfusion.

Conclusion Current clinical practice in cord clamping in preterm infants varies significantly in the UK. Despite research showing benefits without any significant adverse effects only 24% units delay cord clamping or use others means to facilitate placental transfusion. A randomised control trial is needed to provide further

evidence on effects of early and delayed cord clamping in preterm infants.

22 TISSUE OXYGENATION IN THE LIGHT OF NON-INVASIVE AND CONTINUOUS NEAR-INFRARED SPECTROSCOPY AND IMAGING (NIRS, NIRI)

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Near-infrared spectrophotometry (NIRS) and imaging (NIRI) are quickly growing optical methods to non-invasively and in vivo study oxygenation of human tissue. NIRS and NIRI are appreciated by patients, relatives e.g. parents, medical personnel and researchers because the methods are harmless, painless, quantitative, bedside applicable, enable continuous measurements (monitoring) and are thus well suited even for fragile and vulnerable intensive care patients.

The presentation will briefly explain the main principles of NIRS and NIRI, including the parameters that can be measured. The relevance of NIRS/NIRI measurements in research and clinics and also potential pitfalls will be discussed.

Then the main applications of NIRS and NIRI in neonatal medicine will be reviewed, e.g. measurements of the brain to avoid hyper- or hypo-oxygenation to safeguard the brain or to study brain activity and function and peripheral measurements, e.g. liver, gut, muscle. The state of these applications and their validity will be addressed.

An increasing number of commercial NIRS instruments is available and an overview will be given.

In an outlook future technical developments, which will enable to non-invasively measure other clinically important parameters such as blood flow, cytochrome oxidase redox state, water and lipids will be presented. Finally, the state of the art in tomographic NIRI with continuously increasing spatial resolution will be presented.

23 UTILITY OF MICROCIRCULATION ANALYSIS IN A PAEDIATRIC ANIMAL MODEL OF HYPOVOLEMIC SHOCK

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Background and aims Evaluation of tisular perfusion is very important in critically ill patients. Several techniques are used to assess tisular blood flow. Most of them are invasive and non accurate. Sidestream dark field imaging is proposed to be a useful non-invasive method to evaluate microcirculation.

Methods Prospective, observational study in 17 two month-old piglets (8.6±1.1kg). Following mechanical ventilation, hypovolemic shock was induced by controlled 30 ml/kg bleed. 5 video sequences were recorded in each pig at basal time, during shock, and after fluid resuscitation using Microscan Microvision® device. Recorded video sequences were analysed later. Microcirculation was assessed determining perfused vessel density (PVD), microvascular flow index (MFI) and heterogeneity index (HI). Automated vascular analysis (AVA®) software was used to analyze the sequences.

Results Before bleed median values for PVD (13.6/mm3 ±2.4) and MFI (2.75±0.22) where higher and HI (0.21±0.14) was lower than during shock (12.4/mm3±1.4, 1.97±0.43 and 0.58±0.36 respectively) ($p<0.05$). After fluid resuscitation PVD and MFI median values increased (13.69/mm3±1.56 and 2.63±0.26 respectively) and HI decreased (0.32±0.22) ($p<0.05$).

Conclusions Lower vessel density and slower microvascular blood flow and higher flow heterogeneity occurred during shock. Computerized microcirculation analysis using sidestream dark field was able to distinguish between basal condition and hypovolemic shock and between hypovolemic shock and after fluid resuscitation.

24 CORRELATION OF MICROCIRCULATION ANALYSIS WITH HEMODYNAMIC AND BIOCHEMICAL PARAMETERS OF TISULAR PERFUSION

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Background and aims Microcirculation assessment focus on 3 components: Vessel density, perfusion, and heterogeneity of microcirculation, measured as perfused vessel density (PVD), microcirculation flow index (MFI), proportion of perfused vessels and heterogeneity index (HI). Correlation of these parameters with hemodynamic and perfusion parameters is not well established.

Methods Prospective, observational study in 17 two-month-old sedated, relaxed and mechanically ventilated piglets (8.6±1.1kg). Video sequences were recorded using Microscan Microvision® device at three different times: before, after induced hypovolemic shock and after fluid resuscitation. 51 sets of measurements where obtained by the analysis of video sequences using automated vascular analysis software. Microcirculation was assessed determining PVD, MFI and HI.

Results PVD showed correlation with MFI (r: 0,589) and central venous oxygen saturation (SvO2) (r:0,383) and HI (r:-0,600) (all $p<0.01$). MFI showed correlation with PVD (r:0,589), systolic (r:0,540), diastolic (r:0,443), and median (r:0,517) blood pressure, cardiac index (CI) (r:0,578), SvO2 (r:0,462), internal carotid artery flow (ICAF) (r:0,623) HI (r:-0,864), lactate blood levels (r:-0,476) (all $p<0.01$), and intramural gastric pH (r:0,352) (p:0,028).

HI showed correlation with PVD (r:-0,600), MFI (r:-0,864), systolic (r:-0,359) and median (r:-0,350) blood pressure, CI (r:-0,389), arterial pH (r:-0,458), SvO2 (r:-0,492), ICAF (r:-0,458) (all $p<0.01$), systemic vascular resistance index (r:0,316) (p:0,027) and diastolic blood pressure (r:-0,291) (p:0,038).

Conclusions Microcirculation parameters (PVD, MFI and IH) were consistent and related to global hemodynamic and tissue perfusion parameters.

25 CAN LOW PERFUSION INDEX PREDICT THE TREATMENT NEED IN PREMATURE INFANTS WITH PATENT DUCTUS ARTERIOSUS?

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Background and aims Perfusion index (PI) shows real time changes in peripheric blood flow. Among critically ill infants, it predicts poor perfusion and the severity of the disease. Early diagnosis and treatment of PDA is important to prevent complications due hemodynamically significant patent ductus arteriosus (PDA). In this study, we aimed to compare the PI values of premature infants with and without hemodynamically significant PDA.

Methods Forty one premature infants were evaluated with echocardiography at the postnatal days 0 and 3. Patients were grouped as: Group 1 (n=19): no - PDA; Group 2 (n=10) hemodynamically nonsignificant PDA; Group 3 (n=12) hemodynamically significant PDA. PI was measured during a quiet state at the postnatal days 0, 1, 2 and 3 by Masimo pulse oximeter. Clinical characteristics of the infants were recorded prospectively.

Results All the study groups were similar with regard to birth weight (1473±51 grams) and gestational age (30±2.9 weeks). Group