Significance of acute-phase reactions in the diagnosis of coagulase negative bacteraemia in preterm babies

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Introduction: Coagulase negative Staphylococcal bacteraemia (CoNS) has emerged as the most common cause of increased morbidity, cost of treatment, inpatient stay and vulnerability to complications. It is difficult to diagnose in the absence of any gold standard test and significance of acute-phase reactions in diagnosis in preterm babies is also debated. Presently, no test is available which can relate sickness and positive cultures effectively. There is no tool to ascertain the need for full treatment/no treatment which leads to repeated short courses of antibiotics, rapid development of resistance and associated complications. We have attempted to assess the statistical and clinical significance and predictive power of acute-phase reactions for the diagnosis of CoNS bacteraemia with reasonable certainty in the absence of any gold standard test.

Methods: Admissions between 1/10/02 and 31/3/03, in the regional neonatal unit RMH Belfast, fulfilling the defined ‘case inclusion’ criteria of babies below 30 weeks gestation, symptomatic, Culture positive, who responded adequately to the appropriate antibiotics, were included in the study. Complications were defined as development/worsening of CLD, NEC, Meningitis, death, increased ventilator requirements, secondary sepsis or any new inflammatory condition. Acute-phase reactions (CRP, total and deferential WBC count) were called significant only if peak was obtained between 24 h before and 72 h after positive culture results. Results were subjected to statistical testing using $\chi^2$ test (univariate analysis), logistic regression (multivariate analysis) and the likelihood ratio for calculating their predictive power.

Results: Number of admissions to NICU: 274, number of CoNS positive cultures in babies: 53, rate of CoNS detection: 53/274 per 6 months (39% per annum). Sick preterm babies had a CRP peak within specified time ($P$ value $\chi^2$ test $= 0.003$). There was no correlation found between bacteraemia and total WBC count/peak ($P$ value $\chi^2$ test $= 0.47$) though there was a significant peak in deferential neutrophil count with in the specified time in sick preterm babies ($P$ value $\chi^2$ test $= 0.005$). Peak CRP also had significant association with complication rate ($P$ value, $\chi^2$ Test $= 0.02$) but total WBC count had no correlation with complication rate ($P$ value, $\chi^2$ Test $= 0.15$). CRP had 100% sensitivity but 0% specificity; it had 66% positive predictive value but 0% negative predictive value for bacteraemia. Area under ROC Curve is 0.57. Peak in neutrophil count was more predictive of bacteraemia, sometimes in spite of normal total WBC count. Peak in neutrophil count did not have any predictive value for complications. Peak neutrophil count had 97% Sensitivity, 16.6% Specificity, 69.4% Positive predictive Value, 75% negative predictive value and 0.78 is the area under ROC Curve.

Conclusions: Acute-phase reactions, CRP and differential neutrophil count have a significant statistical and clinical diagnostic and prognostic value in CoNS bacteraemia in preterm babies.

Lung volumes in infants with mild–moderate bronchopulmonary dysplasia

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Introduction: At postmortem examination, mild-moderate bronchopulmonary dysplasia (BPD) is associated with moderate alveolar septal fibrosis and a normal vascular bed, but there is evidence of inhibition of acinar development and poor alveolarisation. We have postulated that survivors of mild-moderate BPD will have low lung volumes.

Methods: Lung volume was assessed by measurement of functional residual capacity (FRC) using a helium gas dilution technique and specially designed infant circuit. Measurements were made in the BPD infants as soon as they no longer required supplementary oxygen and in non-BPD infants at a similar post-conceptional age (PCA). Twenty infants with mild-moderate BPD (oxygen dependent beyond 28 days but not beyond term) and 20 non-BPD infants (oxygen dependency <28 days) were studied at a median PCA of 36 (range 33–28) weeks.

Results: The BPD compared to the non BPD infants had lower lung volumes (median 20, range 13–32 ml/s/kg versus median 26, range 20–35 ml/s/kg, \( P = 0.001 \)), but they were born at an earlier gestational age (\( P = 0.003 \)), lower birthweight (\( P = 0.004 \)) and studied at a greater postnatal age (\( P = 0.024 \)). Regression analysis, however, demonstrated that FRC was related to BPD (\( P = 0.005 \)), independently of gestational age, birthweight and postnatal age.

Conclusions: These results support the hypothesis that infants with mild-moderate BPD have acinar maldevelopment and poor alveolarisation.

Bronchiolitis in premature babies: the impact of Palivizumab use in a District General Hospital

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Introduction: Palivizumab, an RSV vaccine has been shown to be effective in reducing hospitalisation of premature babies with bronchiolitis.\(^1\) However, due to its expense, it has been shown not to be cost effective if given to all children meeting its license indications.\(^2\) Therefore, its usage has varied between hospital trusts.

Methods: At Royal Oldham Hospital we have attempted to assess whether the use of Palivizumab has been effective in reducing bronchiolitis in our most vulnerable babies. Two studies were carried out and during these periods Palivizumab was given to babies under 6 months who were born at less than 32 weeks and had chronic lung disease (CLD) and to babies under 2 years of age receiving home oxygen for CLD within the previous 6 months.

Results: The first study carried out between January and December 2000 reviewed 38 babies born at less than 32 weeks gestation. Nine babies (24%) had chronic lung disease and seven (18%) were immunised. In the immunised group there were two admissions with respiratory illnesses one with bronchiolitis. In the unimmunised group there were six admissions, three with bronchiolitis. The second study reviewed the 13 babies immunised between September 2002 and January 2003 of which two were admitted, one with RSV-positive bronchiolitis. Overall, in our small sample 10% of immunised babies developed bronchiolitis requiring admission, as did 10% of unimmunised babies. The cost of immunisation in 2002–2003 was just over £27,000 (vaccine cost only).

Conclusions: Current guidelines (2003–2004) offered Palivizumab only to infants on oxygen\(^3\). It is therefore now important to study the effect of these changes on admissions among preterm infants with chronic lung disease.

References


Investigation of newborn infants at risk of acquiring hepatitis C: UK and Eire questionnaire survey

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Introduction: The prevalence of Hepatitis C virus (HCV) has been shown to be 0.8% in pregnant women attending an antenatal clinic in inner city London.\(^1\) The estimated risk of vertical transmission of HCV is around 6%.\(^2\) Passive acquisition of maternal antibodies complicates the diagnosis of HCV in an at risk infant and polymerase chain reaction (PCR) to viral messenger RNA is the only way of diagnosing infants under 18 months of age. There is no consensus as to the optimal frequency of rechecking viral status in order to identify
infection and its clearance or progression to chronicity. This study was undertaken to examine the range of existing protocols for the investigation of infants at risk of vertical transmission of HCV.

Methods: A postal questionnaire was sent to the medical directors of all 240 neonatal units in the United Kingdom and Eire. Questions were posed regarding unit protocols for screening mothers for HCV, infants at risk of acquiring HCV, the type of tests performed and arrangements for follow-up.

Results: Questionnaires were returned from 170 neonatal units (71%). Seven per cent of units screen all women in antenatal clinic for HCV antibodies. Seventy-seven per cent performed targeted screening of at risk mothers. Twenty-three per cent of units used cord blood for initial screening of the infants. Eight per cent of units do not test infants of mothers known to be infected with HCV. Sixty-five per cent obtained HCV PCR at birth. Criteria given by respondents for confirmation of lack of HCV infection included: negative HCV PCR at 6 months (18%), 1 year (34%), 18 months (17%) or two years (9%).

Conclusions: There were wide variations in practice for screening mothers and monitoring infants at risk of acquiring HCV. The testing of cord blood is not recommended due to the risk of maternal blood contamination. Whether any of the protocols reported in this survey offers a clear advantage over the others remains to be established. Due to the mobility of many at risk mothers, an agreed nationwide protocol for testing infants is desirable.

References


Staphylococcus aureus bacteraemia: a 10-year review on a neonatal and paediatric unit

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Introduction: Rates of Staphylococcus aureus bacteraemia (SAB) are now performance indicators for hospital-acquired infection. In adults with SAB mortality is high and up to 40% are caused by MRSA. However, there is little data on SAB in neonates and children in the UK. We have described the presentation, management and outcome of SAB on a neonatal and paediatric unit in a District General Hospital (DGH).

Methods: Case notes of children <16 years with SAB between May 1993–April 2003 were studied. SAB which developed >48 hrs after admission was defined as hospital acquired. Contamination was ‘definite’ if repeat culture was negative or ‘probable’ if there were no features of infection and no treatment was given.

Results: Neonatal unit: 33 of 40 episodes were reviewed (median gestation 32 weeks, median age 21 days). 3/33 (9%) were contaminants. All SAB was hospital acquired. 26/30 (87%) had non-specific presentation, but 15 developed a focus (skin 12, chest 3). 17 (57%) infants had central venous catheters (CVC). Eight (27%) infants had MRSA bacteraemia, 7 with CVCs. Three (9%) infants died. Paediatric unit: 64 of 70 episodes were reviewed (median age 2 years). 13/64 (20%) were contaminants. 10/51 (20%) were hospital acquired. Presentations were with skin infection 18, bone/joint infection 13, nonspecific 13, respiratory 8. 2 (4%) had MRSA. One (2%) child died (post-BMT for leukaemia).

Conclusions: SAB on a neonatal and paediatric unit shows a very different pattern compared to SAB in adults: a lower mortality, a weaker association with CVC, and lower incidence of MRSA. The proportion of hospital-acquired infection (paediatric unit) is low, making SAB an unreliable performance indicator. Most SA in blood cultures are not due to contamination. Prospective studies are needed to determine appropriate investigation and treatment.

An audit of paediatric audits

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Introduction: To assess whether audits done at a children’s hospital fulfilled the criteria for ‘full’ audits and how many closed the loop by re-auditing with the standard that 90% of audits should have fulfilled the criteria for ‘full’ audits.

Methods: One hundred and thirty-four registered audits undertaken at a children’s hospital over a 6-year period were examined retrospectively. Audits were classified according to verified criteria.1 The audit cycle was categorised into six stages: Stage 1, choosing a topic; Stage 2, setting target standards;
Stage 3, observing practice; Stage 4, comparing performance with standards; Stage 5, implementing change and Stage 6, repeating the audit cycle. The different levels of audit were defined as follows: A ‘full audit’ satisfied five of the six stages of the audit cycle, while a ‘partial audit’ satisfied three of six stages and a ‘potential audit’ satisfied just two stages. The ‘planning audit’ group included audits where a topic was chosen and only the intentions for audit were outlined.

**Results:** Out of 134 audits, eight (6%) were excluded, as they were research projects. Of the remaining 126 audits, 35 (28%) were ‘full’ audits and 53 (42%) were ‘partial’ audits. Re-auditing was done in 25 (20%).

**Conclusions:** Specific training on audit methodology should be part of early departmental teaching for junior doctors. A definite time frame for re-auditing should be decided at the time of undertaking the audit. Audit departments should undertake an audit of their audits regularly to monitor completion of the audit cycle. This would promote awareness and lead to better quality audits. Unless properly done, clinical audit would be a fruitless activity done by junior medical staff in an attempt to fulfill the educational requirements of a post.

**References**


**Paediatricians’ views on cleft lip and/or palate management in Wales**

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**Introduction:** Cleft lip and/or palate (CLP) is one of the commonest congenital malformations with an incidence approximately one in 700. CLP services were identified as a service priority by the clinical standards advisory group (CSAG) in 1998. Surgical services were centralised to foster expertise in fewer centres. In view of significant comorbidity in CLP patients like issues relating to feeding and growth, hearing, speech and language, associated malformations and genetic syndromes, support services of a multidisciplinary nature coordinated by named paediatricians was proposed for each trust or hospital. However, beyond referral to the surgeons there seem to be inadequacies in paediatric input and follow-up of such patients. Our survey explored these aspects from the view point of paediatricians with the aim of ascertaining consultant paediatricians’ views on assessment, investigation, coordination of multidisciplinary services and follow-up of children with CLP.

**Methods:** Postal questionnaire survey. Background epidemiologic data were obtained from the congenital anomaly register and information service for Wales (CARIS).

**Results:** Fifty-five of 100 consultant paediatricians returned completed questionnaires. Only half follow a protocol (53.3%). Up to 80% followed CLP patients in their clinics. Thirty-four per cent request a routine genetic opinion, 32% an echocardiogram while only 13% refer for a screening renal ultrasound scan. A majority carry out hearing and speech and language (SALT) assessments (90% and 86%). Child psychology counselling was sparsely available. Services of the two regional CLP referral centres (Swansea, Wrexham- Liverpool) were found satisfactory by the majority (92%).

**Conclusions:** The management of CLP patients by consultant paediatricians in Wales is not uniform. Paediatricians should assume a greater role in the care of these patients to co-ordinate appropriate health monitoring, investigation and support services.

In children with cystic fibrosis, can bacteria isolated from spirometry filters guide clinical management?

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**Introduction:** Concerns regarding cross-contamination of organisms during cystic fibrosis clinics has lead to the widespread use of disposable filters on spirometry equipment. Cross-infection risk from forced exhalation during spirometry would suggest that cultures taken from such filters might be used for lower respiratory tract pathogen isolation. The technique removes the potential for contamination from pharyngeal flora, and may also be a preferred technique than cough swab sampling.

**Methods:** Preliminary studies on spirometry filters (Vitalograph<sup>®</sup>) demonstrated their suitability
for yielding pathogens. Children able to perform spirometry were recruited from cystic fibrosis clinics at the Royal Shrewsbury Hospital, Shrewsbury, and Princess Royal Hospital, Telford. Children’s opinion of cough swabs was obtained.

**Results:** The spirometry filters yielded pathogen growth in 3% of cases (1/30). One case had a growth of Candida spp. which corresponded with the cough swab. This compared with positive bacteriology in 69% of cough swabs and 86% of sputum specimens collected at the same clinics. Seventy-seven per cent of children expressed a dislike of cough swabs (20/26).

**Conclusions:** The spirometry filter culture technique for isolating bacteria cannot aid clinical management. Results raise doubts over spirometry equipment being a significant cause of cross contamination. The high level of dislike for cough swabs should prompt further investigation into patient acceptability of other available techniques such as cough plates or upper airway aspirate cultures.

**Hippocampal neuronal loss following experimental traumatic brain injury in the rat is predominantly due to necrosis rather than apoptosis**

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**Introduction:** Traumatic brain injury (TBI) is the most common cause of death and acquired disability in children and young adults in the developed world. The hippocampus is selectively vulnerable to TBI and hippocampal damage is believed to underlie the high incidence of memory problems following head injury. Following TBI the injured hippocampal neurons demonstrates, besides necrosis, cell loss by apoptotic mechanisms leading to suggestions that anti-apoptotic treatments may improve outcome. However, much uncertainty exists concerning the relative roles of apoptosis versus necrosis in the production of hippocampal neuronal loss after TBI. We have attempted to define the relative contributions of apoptosis and necrosis to neuronal loss in the hippocampus in an experimental head injury model.

**Methods:** Using the rat fluid percussion injury (FPI) model of TBI, characteristics of hippocampal neuronal loss were compared between head injured and control rat brains using (1) basic histology, (2) dUTP nick end labeling (TUNEL) histochemistry and (3) immunocytochemical identification of caspase (CASP3/p89) activation.

**Results:** The proportion of necrotic neurones in the hippocampal dentate hilar regions was significantly higher in animals undergoing FPI on both the ipsilateral (sham mean 10.1 ± 2.4%, FPI mean 26.3 ± 3.7%, \( P = 0.0017 \)) and contralateral sides (sham mean 9.5 ± 2.3%, FPI mean 18.8 ± 3.3%, \( P = 0.0380 \)). Very few apoptotic neurones were observed in H&E sections in the hippocampal dentate gyrus, CA3 & CA2 following FPI. Strong TUNEL & CASP3/p89 immunopositivity was observed in the injured cortical and sub-cortical white matter ipsilaterally whereas other regions of the hippocampus demonstrated very few TUNEL, CASP3 & p89 immunopositive cells.

**Conclusions:** Cellular death in the hippocampal neurons following experimental traumatic brain injury occurs by predominantly non-apoptotic processes. Anti-apoptotic therapies are hence unlikely to be helpful in preventing memory deficits secondary to hippocampal damage in young adults although they may have a role in reducing cortical and subcortical damage following cerebral contusion.

**Can we believe the Oxford ‘levels of evidence’ and ‘grades of recommendation’?**

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**Introduction:** With the advent of evidence-based guidelines, there have been a profusion of systems for indicating the ‘levels of evidence’ and ‘grades of recommendation’. Different systems indicate the quality of the scientific evidence and the weight given to the recommendations in many different ways. Users of evidence-based guidelines need to be certain that the quality mark given is reliable and meaningful. There are to date no studies which describe how reproducible assessments made in any of these systems are. The Oxford system has been widely used in the UK and internationally. The quality of scientific evidence (‘level of evidence’) is assigned through a combination of type of question asked, design of the study
and its results. The weight given to the recommendation ('grade of recommendation') is assigned on the quality and quantity of evidence and directness of the studies to statement being made. We have attempted to assess the validity of the Oxford 'levels of evidence' and 'grades of recommendation' system when used answering real clinical questions in paediatrics.

**Methods:** Two blinded prospective comparison studies. Study one used four assessors addressing the 'levels of evidence' for 10 clinical questions generated from a paediatric journal club. Study two used four groups, each of 6–8 individuals, assessing the 'grades of recommendation' for four statements from a guideline on community acquired pneumonia. Reproducibility was assessed by the kappa statistic, which describes the level of agreement beyond chance of two observers. (A kappa value of 0–0.2 indicates poor agreement, 0.2–0.4 indicates fair agreement, 0.4–0.6 indicates moderate agreement, 0.6–0.8 is good and >0.8 is excellent.)

**Results:** The 'levels of evidence' were highly reproducible, with an inter-rater reliability kappa of 0.71. The 'grades of recommendation' were highly congruent between groups (kappa 0.8) but very varied between individuals prior to group discussions (kappa 0.14).

**Conclusions:** The Oxford 'levels of evidence' and 'grades of recommendation' are highly reproducible. They should be adopted as the basis of quality grading guidelines until an international consensus system is established.

**Is procalcitonin useful in early diagnosis of serious bacterial infections in children presenting with fever without localising signs?**

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**Introduction:** Procalcitonin has been shown to be a specific marker of bacterial infection and is markedly elevated in children with septic shock and severe meningococcal disease compared with healthy controls. We have compared the diagnostic accuracy of procalcitonin with CRP, WBC and absolute neutrophil count for early diagnosis of serious bacterial infection (SBI) in children presenting with fever without localising signs (FWLS).

**Methods:** Prospective observational study involving two centres. Seventy-two consecutive febrile children (with temperature ≥39°C) aged 1–36 months attending paediatric directorate with FWLS were included in the study. Isolation of a pathogenic organism from a normally sterile body fluid was taken as the gold standard for SBI. Study was approved by LREC.

**Results:** Median age of the children was 18.5 months (1–36 months). Median duration of febrile illness was 2 days (1–8 days). The children were divided into three groups. Group 1: SBI (8 (11.1%)), Group 2: children with possible bacterial infection (19 (26.3%)), Group 3 (45 (62.5%)): viral or possible viral infection. Median (range) PCT level was higher (3.09 (0.25, 25.4)) in children with SBI compared to viral infections (0.43 (0.14, 8.3) (P = 0.005)); however median (range) CRP level were similar. Area under the curve (AUC) was 0.52 (95% CI 0.36, 0.71) for ANC, 0.56 (95% CI 0.38, 0.74) for WBC, 0.66 (0.42, 0.91) for CRP and 0.79 (0.61, 0.97) (P > 0.5) for procalcitonin and was not significantly different. Sensitivity and specificity (50% and 84.4%, respectively) of procalcitonin >2 ng/ml was similar to CRP (>50 mg/l) (75%, 75.5%), WBC and to the McCarthy’s clinical scoring (87.5%, 80%). LUMI test and PCT Q showed good correlation (R = 0.72)

**Conclusions:** Procalcitonin is not useful for early detection of SBI in children presenting with FWLS in a general paediatric setting.

**Cognitive and psychological outcome following surgically treated traumatic extradural haematoma in children**

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**Introduction:** Traumatic extradural haematoma (EDH) in children is regarded as having a good outcome, but few data exist concerning cognitive and psychological outcome. We have defined cognitive and psychological outcome in children with surgically treated EDH one month after injury compared to matched uninjured controls.

**Methods:** Prospective study. TBI severity was classed by admission Glasgow Coma Score (GCS) as mild (GCS 13–15), moderate (GCS 9–12) and severe (GCS 3–8). Controls were matched for age, sex, socioeconomic status and academic achievement. Cognitive outcome was assessed by Wechselel intelligence scales for children (WISC)-111, test of
everyday attention in children (TEA-ch) and children’s memory scales (CMS). Psychological outcome was assessed using Birleson depression scale (BDS), impact of events scale (IES) and Achenbach child behaviour checklist (CBCL).

Results: Twelve children with EDH and 12 matched controls were recruited over 2 years. Eight (66%) were boys. Mean age was 12 years, range 6–16. Four had GCS ≤ 8, Four GCS 9–12 and Four GCS 13–15. All EDH children underwent surgical evacuation; all had good neurological outcome. At follow-up, EDH children scored significantly lower than controls on performance IQ (P = 0.016) and TEA-ch map mission (P = 0.01). There was no significant difference between EDH children and controls for verbal IQ (P = 0.50), TEA-ch dual task (P = 0.11) and opposite worlds (P = 0.21) or CMS (P = 0.43). There was no significant difference between EDH children and controls for BDS (P = 0.16) but a highly significant difference between BDH children and controls for CBCL total problem score (P < 0.001), Externalising Score (P = 0.003) and Internalising score (P = 0.009). Three of 11 children (29%) who completed the IES scored ≥ 17, indicating possible Acute Stress Disorder; 1/12 (8%) was too psychologically disturbed to complete the IES.

Conclusions: The results suggest that EDH children are at risk of cognitive and psychological problems and that follow-up is therefore indicated.

Relationship between the electroencephalogram (EEG), depth of coma, clinical seizures, raised intracranial pressure (ICP) and outcome in children with non-traumatic coma (NTC) admitted to a regional PICU

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Introduction: NTC is an important cause of childhood mortality and morbidity. EEGs are often performed in children with NTC, but few data exist concerning the relationship between EEG findings, neurological state and outcome. We have examined the results of EEGs obtained in all children with NTC admitted to a Regional PICU over the 5 years 1997–2001 and related the results to depth of coma, clinical seizures, raised ICP and outcome.

Methods: A regional PICU database, incorporating clinical, radiological and outcome data of all admissions for NTC was interrogated and cross-referenced with neurophysiological records. Coma was defined as Glasgow coma score (GCS) < 13 for > 6 h. The background activity of the initial and worse EEGs was classified as: (1) normal, (2) slow waves, (3) generalised low amplitude, (4) burst suppression or (5) isoelectric. Seizure discharges on EEG were classed as: (1) isolated, (2) electrical storms or (3) continuous. EEGs were excluded from analysis if the patient was receiving thiopentone.

Results: Two hundred and seventy-five EEGs were recorded in 130 patients over 141 PICU admissions. 141/330 (39%) total NTC admissions underwent EEG. Median age was 2 years, range 0.01–16; median GCS was 8. Clinical seizures were seen in 117/130 (90%) patients. Initial EEG background appearances were: normal (25: 18%); slow waves (79: 56%); burst suppression (13: 9%); generalised low amplitude (5: 4%); isoelectric (7: 5%); continuous seizure discharges (10: 7%). 53/141 (38%) initial EEGs showed seizures. There was a significant relationship between initial EEG background and outcome (P = 0.009) and EEG seizures and outcome (P = 0.009). Other correlations were EEG background and raised ICP (P = 0.01) and EEG seizures and clinical seizures (P = 0.02). There was no correlation between GCS and either EEG background (P = 0.49) or EEG seizures (P = 0.22). Multivariant analysis showed that raised ICP and EEG appearance were independent predictors of poor outcome (P < 0.001; P = 0.04).

Conclusions: Our results indicate that the EEG has a role in NTC not only in the detection and monitoring of seizures but also as a prognostic indicator.

Current international patterns of propofol use in PICU

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Introduction: In 2001, the Medicines Control Agency and Committee on Safety of Medicines (CSM) repeated advice that propofol was contra-indicated in children aged 16 years and under when used as an infusion for sedation. They also stated that propofol was not recommended for sedation for procedures in children.

Methods: We have conducted an e-mail-based questionnaire to examine the current patterns of propofol use in the United Kingdom and in North America. We contacted the all UK PICUs and those from PICUs in North America offering training fellowships.
Results: We received responses from 15 UK Units (75%) and 33 units in North America (52%). In 47% of UK units propofol was used for ongoing sedation, compared to 61% of North American units. Units frequently used propofol in defined clinical circumstances, in limited doses, in older children for short periods only. Propofol was used for sedation during procedures in 100% of units although 35% of UK units said that they would use it less frequently in this setting than in the past. Only 18% of North American Units reported that they would be less likely to use propofol for procedures than in the past.

Conclusions: Despite clear warnings from the CSM propofol is still used for ongoing sedation in 47% of UK PICUs responding in this study. Reasons for this include the unique profile of the agent and the clear paradox involved in its licensing for use in maintaining anaesthesia in children over 3 years, but not for sedation in PICU in similar doses, for similar periods, in the same children.

Prevalence and correlates of depression in 7–17 year olds diagnosed with type 1 diabetes mellitus

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Introduction: In order to determine the prevalence of, and factors contributing to, depression in 7–17 years olds with type 1 diabetes mellitus (T1DM) we have conducted a cross-sectional survey using one newly designed pre piloted questionnaire for parents (PQ) and one established validated Children’s depression inventory (CDI).

Methods: Sixty-four 7–17 years olds with T1DM and a parent for each participated (total = 128) Outcome measures: CDI assessed prevalence of depression through CDI-T-scores. The PQ assessed socio-demographic variables, perceived severity and understanding of diabetes and its control, and awareness of symptoms of depression in their child. Medical records were consulted. Predictors of CDI-T-scores and HbA1c level were analysed.

Results: Response rate 91.43%. The prevalence of depression was 18.8%. Linear regression revealed high CDI-T-scores correlated with single parents; non-white ethnic groups; thinking a cure for diabetes unlikely; high HbA1c levels; suicidal ideation; and high BMI-for-age \(F_{8,55} = 10.847, P < 0.001\); adjusted \(R^2 = 0.556\), accounting for 55.6% of the variation. Linear regression also revealed higher HbA1c levels correlated with high CDI-T-scores, lower family support, older children, females, co-existing illness, children with a poor perception of schooling, and whether the parent thought a cure for diabetes likely \(F_{7,56} = 8.974, P < 0.001\); adjusted \(R^2 = 0.470\), accounting for 47% of the variation. High HbA1c levels correlated with non-white ethnic groups \(P = 0.013\), negative mood \(P = 0.004\), older age at diagnosis \(P = 0.033\), higher symptoms of depression noticed by parents \(P = 0.028\) and increased diabetes home care contact \(P = 0.004\).

Conclusions: High depression scores are linked with poor diabetic control. Health professionals should inquire about symptoms of depression during clinics. Diabetes health care teams should assess the above risk factors and offer appropriate support.

Characterising inherited non-type 1 diabetes in childhood; a heterogeneous group of disorders

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Introduction: Adult studies in familial diabetes have led to the discovery of six genes for maturity onset diabetes of the young (MODY) (HNF-4a, Glucokinase, HNF-1α, IPF-1, HNF-1α and NEUROD1), however, 20% of MODY families lack a described mutation. Some children with dominantly inherited non-type 1 diabetes do not link to known MODY genes. Our primary aim was to define the characteristics of families with childhood onset non-type 1 diabetes and autosomal dominant inheritance. Our secondary aim was to develop a resource for identifying new diabetes genes.

Methods: Recruitment was from three sources: a national survey of childhood diabetes; the UK MODY database; and direct contact with consultant paediatricians. At a home visit all family members available were measured, and had fasting bloods taken for biochemical and genetic evaluation.

Results: Fourteen families have been visited (15 probands). The median age of the index case at diagnosis of diabetes was 11.0 years (range 0–15); median HbA1c = 6.4% (4.1–11.4). six were insulin treated, three with oral agents and six with diet. Judged by history, examination and available data
these families form five groups; probable latent autoimmune/type 1 diabetes \( (n = 2, \text{median BMI-SDS} = -0.4) \), triglyceride 0.65 mmol/l, c-peptide 244 pmol/l); probable MODY \( (n = 7, \text{median BMI-SDS} = 0.1) \), triglyceride 0.64 mmol/l, c-peptide 638 pmol/l); probable type 2/insulin resistant diabetes \( (n = 3, \text{median BMI-SDS} = 2.0) \), triglyceride 1.92 mmol/l, c-peptide 815 pmol/l); probable syndromic diabetes \( (n = 2, \text{median BMI-SDS} = 2.7) \), triglyceride 3.62 mmol/l, c-peptide 1479 pmol/l); and neonatal diabetes \( (n = 1) \).

**Conclusions:** Inherited childhood non-type 1 diabetes is rare, but families are available to be recruited. They may be differentiated on clinical and biochemical findings, and it remains to be seen if these differences will be borne out in genetic differences. Further recruitment and genetic analysis will enable better characterisation of childhood familial non-type 1 diabetes.

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**Involving children and families in the design of a diabetes education programme**

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**Introduction:** Diabetes control usually deteriorates during adolescence. Structured education is increasingly recognised as the ‘way forward’ to improve outcomes, yet most paediatric diabetes education offered in the UK is unevaulated. Dose adjustment for normal eating (DAFNE) is a week-long skills-based course for adults with type 1 diabetes. Trials have shown improved glycaemic control and quality of life. Two main problems exist in adapting the programme for children: the design of the course is not appropriate for children and adolescents. The design of the course is not appropriate for children and adolescents. The aims of the study were to seek the views of children and adolescents with type 1 diabetes and their parents concerning the feasibility of a DAFNE regime, and their recommendations for the design and implementation of the course.

**Methods:** Twenty-four children (12 M, 12 F, mean age = 13.07 years, SD = 1.59 years) and 29 parents (eight fathers, 21 mothers) were recruited and randomly assigned to one of four focus group sessions. Parents and children attended separate, but parallel groups each run by two moderators. Discussions were tape recorded and transcribed before analysis.

**Results:** Children felt that they would manage the new regime, given the potential benefits. Some parents were worried whether their child could cope, and about potential negative consequences of dietary freedom. Management in school and parental anxiety were identified as potential barriers. Various recommendations were made regarding course content and delivery including school length days, practical sessions, IT-based material and separate parent education.

**Conclusions:** The design of a paediatric DAFNE curriculum has been influenced by the views of children and their families. Such methodology could be readily applied to other paediatric research settings.

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**Colorectal surgery in paediatrics: collaboration between paediatric gastroenterologist and specialist colorectal surgeons**

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**Introduction:** Increasingly paediatric surgery is being performed at specialist centres by paediatric surgeons. However, it is recognised that certain colorectal procedures may be performed much more frequently by specialist surgeons who will therefore have greater experience. Collaboration between a paediatric gastroenterologist and specialist colorectal surgeon may be able to provide this service outside a paediatric surgical centre.

**Methods:** Case notes of all children who underwent colorectal surgery at Singleton hospital in the last 5 years were reviewed retrospectively. Data were collected on demographics, indications for surgery, analgesia used and the incidence of complications.

**Results:** Eighteen surgical procedures were performed in 13 children. The commonest surgical procedure was restorative procto-colectomy \( (n = 7) \) followed by total colectomy with ileostomy \( (n = 4) \). Age at surgery ranged from 7.5 to 16 years with a median of 13 years. Surgery was most commonly performed for inflammatory bowel disease in five
patients and familial adenomatous polyposis in four patients.

Complications were uncommon and managed appropriately. Oliguria and infection were the commonest occurring in two out of 18 procedures. One child developed an anastomotic leak requiring further surgery. Median high dependency unit stay was 5 days; median hospital stay was 10 days. Epidural was used in 16 procedures with good effect. There was a single case of post-epidural headache, which responded to a blood patch. Patient-controlled analgesia was used in 16 procedures, without any complications and was effective in all. Unplanned readmission within 1 week of discharge occurred only once and all patients are currently doing well.

Conclusions: Colorectal surgery can be safely performed outside a paediatric surgical centre with collaboration between a paediatric gastroenterologist and specialist colorectal surgeon. Anaesthetists with experience in paediatrics are an essential part of the team. This approach may allow children to be treated closer to home without compromising quality or safety.

Sigmoidoscopy should be abandoned in the investigation of paediatric inflammatory bowel disease


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Introduction: Inflammatory bowel disease (IBD) consists of Crohn’s disease (CD), ulcerative colitis (UC) and indeterminate colitis (IC). CD is characterised by mucosal inflammation anywhere between the mouth and anus. Inflammation in UC and IC is limited to the colon. Despite a rising incidence of IBD diagnostic delay is still a problem, delayed diagnosis is associated with short stature. This study investigates the influence of disease type, referral pathway and investigations done on time to diagnosis.

Methods: A retrospective case note review was carried out on all children cared for by a regional paediatric gastroenterology centre between 1996 and 2003. Patients were identified by cross-referencing two independent databases with hospital medical records. Diagnosis was based on standard clinical, endoscopic, histological and pathological criteria.

Results: One hundred and forty-eight patients were identified; 36 were excluded because of lack of information/failure to meet diagnostic criteria. Of the remaining 112 patients, 61% had CD, 23% UC and 16% IC. In CD, 22% had isolated colonic disease and 23% ileo-colonic disease. 69% of the UC group had pancolitis at diagnosis. Median age at IBD diagnosis was 11.6 years (no significant difference between CD, UC, and IC). Median time from symptom onset to diagnosis was 25 weeks (CD = 26, UC = 19, IC = 28, P = ns). At diagnosis 67 patients had colonoscopy, 21 sigmoidoscopy and 12 had both. Median times to diagnosis for each group were 12, 20 and 81 weeks respectively (P < 0.05 colonoscopy vs. sigmoidoscopy, P < 0.01 colonoscopy vs. both). Colonoscopy was diagnostic in 95% of cases compared to 57% of all sigmoidoscopies (44% of sigmoidoscopies diagnostic in CD group).

Conclusions: Sigmoidoscopy is associated with diagnostic delay and diagnostic failure in paediatric IBD. A significant number of patients having sigmoidoscopy need a colonoscopy before IBD diagnosis. All UC patients will need a colonoscopy to define disease extent at diagnosis. We conclude that sigmoidoscopy should be abandoned in the investigation of paediatric IBD.

References


CVC occlusion during home parenteral nutrition

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Introduction: Little is known about the frequency of central venous catheter (CVC) occlusion in children receiving home parenteral nutrition (HPN), or the effectiveness of remedial intervention.
We have reviewed our experience in 15 consecutive HPN patients (short bowel syndrome, \( n = 9 \); protracted diarrhoea, \( n = 3 \); Hirschsprung’s, \( n = 2 \); pseudoobstruction, \( n = 1 \)).

**Methods:** Prospective records kept by the HPN nurse specialist were reviewed and crosschecked by a retrospective examination of case notes. Data related to catheter type, length of use, difficulty aspirating blood, subjective resistance to flush, raised infusion pressure, and blockage were collated, together with outcome following our stepwise intervention protocol (saline \( \sim \) urokinase \( \sim \) absolute alcohol). Fifty-one Broviac, two Hickman and one Vygon Leadercath CVC (4.2–9.6 Fr; median 6.6 Fr) were used to deliver 6904 PN days. CVC were routinely flushed with heparin saline (10 U/ml) on a daily basis, but heparin was not included in PN solutions; all patients received lipid emulsion but only one an all-in-one mix.

**Results:** 7/15 patients experienced problems with 17 CVC, occurring after 7–218 (median 85) days of use. On 48 occasions, CVC became ‘stiff’, or blood could not be aspirated despite flushing with saline. A urokinase lock temporarily restored CVC patency but 14/17 ultimately required removal because of complete occlusion, 3–211 (median 26) days later. Twelve CVC suddenly occluded: six were successfully unblocked using saline flush (\( n = 1 \)), urokinase lock (\( n = 2 \)), urokinase followed by alcohol lock (\( n = 2 \)) or alcohol lock alone (\( n = 1 \)). Patency was maintained in one CVC by use of regular alcohol lock.

**Conclusions:** One-third of CVC in our HPN patients became difficult to perfuse or aspirate, almost all later requiring removal because of complete occlusion despite the use of urokinase and/or alcohol locks. Risk was not obviously associated with CVC diameter. This represents the loss through occlusion of one CVC/493 PN days. Urokinase appeared to extend CVC usage by around a month, but sometimes for much longer. Risk factors, preventive strategies and management protocols for CVC occlusion require further investigation.