G369(P) THE DIAGNOSTIC UTILITY OF BONE MARROW ASPIRATE IN PAEDIATRIC LIVER DISEASE

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Aim To identify the usefulness of bone marrow aspirate (BMA) in the diagnosis of paediatric liver disease in order to prioritise its use in the diagnostic algorithm.

Methods A single-centre 17 year retrospective analysis of BMA procedures in paediatric liver patients was undertaken. Clinical and laboratory data were obtained from the Hospital Electronic Patient Records. Sensitivity and specificity of BMA as a diagnostic tool for Lysosomal storage disorders (LSD) and Haemophagocytic Lymphohistiocytosis (HLH) were computed.

Results A total of 184 paediatric liver patients undergoing 218 BMAs were identified. Of these, BMAs in 137 patients (74.5%) did not have any morphological features suggestive of a specific diagnosis, such as LSD or other haematological conditions (i.e. non-diagnostic). In 84% of children with a final diagnosis of idiopathic liver failure and in 87% with metabolic or developmental liver disease, no specific BMA features were identified. In 116 (63%) patients BMA was specifically undertaken to exclude LSD. A final diagnosis of LSD was made in 14 patients. Thirteen (92.9%) of these patients had morphological features on BMA supporting a diagnosis of LSD. In this case, BMA had an overall sensitivity of 75% (95% CI 42.8%–94.51%) and specificity of 92.55% (95% CI 85.26%–96.95%) in diagnosing LSD. A further nine patients received a diagnosis of HLH. Three (33.3%) of the HLH patients had a diagnostic marrow with a sensitivity of 37.50% (95% CI 8.52%–75.51%) but a specificity of 88.24% (95% CI 63.56%–98.54%).

Conclusion BMA is a safe, quick and effective test to undertake in critically ill children with liver disease, where urgent decisions regarding liver transplantation (LT) need to be taken. It is very useful in the diagnostic algorithm of suspected lysosomal storage disorders, particularly in Niemann-Pick C, where nearly all cases have specific morphological findings and where it requires a significantly longer time to obtain definitive molecular diagnoses. Thus, a morphologically non-diagnostic BMA in children with idiopathic liver failure, metabolic or developmental liver disease allows the clinical team to urgently proceed to LT. Diagnostic yield of BMA in HLH was poor highlighting the diagnostic challenges faced by clinicians in this condition.

G370(P) RISK OF INVASIVE PNEUMOCOCCAL DISEASE IN CHILDREN WITH SICKLE CELL DISEASE IN THE ERA OF CONJUGATE VACCINES: A SYSTEMATIC REVIEW OF THE LITERATURE

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Introduction Invasive pneumococcal disease (IPD) is the leading cause of morbidity and mortality in children with sickle

cell disease (SCD). 7-valent pneumococcal conjugate vaccine (PCV7) was first introduced in 2000 in US and at various times in other countries. It was replaced by 13-valent pneumococcal conjugate vaccines (PCV13) in 2010. This PCV is highly effective in preventing IPD in children with SCD. The risk of IPD has not been systematically assessed in children with SCD since the introduction of PCV.

Methods We undertook a systematic review of the English literature published from 2000 to October 2017 to evaluate the risk factors, serotype distribution, clinical presentation and outcomes of IPD in children with sickle cell disease. Data sources included MEDLINE, EMBASE Cochrane library, and references within identified articles.

Results We identified 475 potential studies, of which 66 were duplicates. A further 299 were excluded on the basis of title and abstracts and another 94 studies did not meet eligibility criteria on full-text screening. We included 16 publications involving 11 383 children less than 21 years-olds with SCD. A total of 161 (1.4%) IPD was identified: 147 homozygote for haemoglobin S (HbSS), 10 double heterozygote for haemoglobin S and C (HbSC) and 4 others. Among the nine studies reporting clinical presentation, septicaemia was the commonest (n=69/108; 63.8%) followed by pneumonia (n=20/108; 18.5%). The serotypes associated with IPD in SCD were mainly non-PCV13 (n=117/133; 88%), of which more than a quarter was due to serogroup 15A/B/C (n=34/117; 29%). Serotype 23 F (n=6/16, 37.5%) and 7 F (n=4/16; 25%) were the main vaccine serotypes. Majority were sensitive to penicillin and ceftriaxone. The crude case fatality rate was 11.2% (n=18/161).

Conclusions and clinical implications This report demonstrates the effectiveness of conjugate vaccines to reduce the rate of IPD in children with SCD. However, these children remain at increased risk and are also more likely to die of their infection compared to their peers without SCD. Most IPD cases are now due to serotypes not covered by PCV13. Therefore better prevention strategies are needed to reduce the overall burden IPD in children with SCD.

Quality Improvement

G371 UPLOAD AT HOME: A STEP TOWARDS AUTONOMY FOR PATIENTS WITH DIABETES

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Background Analysis of patient data on glucometers and pumps is required to make clinical decisions. These devices require to be uploaded onto a computer so that data can be reviewed in a systematic way. We observed difficulties in uploading glucometers and pumps in outpatient settings. We identified contributing barriers related to the technology, staff and parents/patients. Uploading devices occupied valuable time of clinicians and specialist nurses, leaving less time to spend with patients and families.

Aim To encourage uploading at home prior to attending the outpatient appointment, which will lead to-

- Improved waiting time in OPD.
- Allow more time with the clinical team.

- Improved parental/patient understanding of diabetes management: Promoting autonomy
- Improve quality of service by increasing efficiency and efficacy.

Methods Discussion in diabetes multidisciplinary team meeting. Process mapping of patient journey and ways to improve upload at home

Collected baseline data of number of patients/families uploading their metres and pumps at home in all three hospitals across the trust.

Multi-faceted approach was implemented to achieve our aim.

- Did home visits to understand the issue more closely.
- Preparation of flyers and leaflets to help parents open their Diasend account and link with the clinic.
- Contacted parent support groups and sent flyers and leaflets to parents via email.
- Encouraged team members to discuss the issue with the parents in clinic.
- Provided a Tablet for the clinic to open Diasend account and link with the clinic.
- Organised a family evening to run 2 Diasend workshops for the parents to open Diasend account and link with the clinic.

Result All three units recorded an increase in number of patients/parents uploading at home. Over the period of 6 months we recorded an increase from 8% to 30%, 35% to 47% and 41% to 62% respectively in diabetes clinics at Princess of Wales Hospital, Morriston Hospital, and Neath Port Talbot Hospital.

Conclusion Downloading at home:

- Enables more efficient use of clinic time and reduces waiting time in outpatient department.
- Has the potential to help improve the patient/parents understanding of diabetes management leading to improved clinical outcomes.
- Motivated healthcare professionals to discuss this issue on every contact.

G372

RAPID CYCLE AUDIT – EMBEDDING MULTIDISCIPLINARY QUALITY IMPROVEMENT IN THE CHILDREN'S EMERGENCY DEPARTMENT

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Aims Quality Improvement is central to the development of any successful department and individual involvement can lead to an increased sense of ownership and potentially improved morale. We set out to design a programme that would involve all members of the Children's Emergency Department (CED) team in measuring performance, designing innovation and monitoring change.

Methods 4 important targets were identified amongst the CED senior team: Pain management; Observation frequency; Sepsis screening and handover. An excel proforma was built allowing different team members to collect data on a rotating weekly basis using the 'Medway' computer system. The proforma auto-populated run charts to measure change which were then posted in a central space within the CED with key messages

shared amongst the multidisciplinary team and discussed at handover.

Results Collection of data took place on 82% and 75% of potential weeks for pain management and observation frequency respectively over 10 months. Of the four initial projects the biggest improvement in care came in the recording of pain scoring at triage from 12% to 75% after introducing mandatory scoring at triage and using a 'pain sticker'. Observation frequency was more problematic with no improvement seen over the time despite increased education. Sepsis was abandoned as the small number of potential patients made the methodology unsuitable. Handover was swapped to safeguarding when local practice was reviewed and is ongoing.

Conclusion This work demonstrated success in embedding data measurement as part of the regular weekly timetable for the department. This first iteration however, failed to make significant improvements in the majority of areas studied and showed the need for both individual project ownership and also time for the team to meet and potentially co-design change. Going forward the programme has been adjusted to study one area for a month at a time with an individual champion for each project.

G373

ABSTRACT WITHDRAWN

G374

IMPROVING THE QUALITY OF PAEDIATRIC PRESCRIBING ON A GENERAL PAEDIATRIC WARD

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Aims Prescribing errors are the most common form of medication errors with potential to cause harm, especially in paediatrics. Majority of prescribing is done by junior doctors, some with little paediatric experience. Previous audits highlighted high incidence of errors but lost momentum following change in junior doctors.

The aim of our project was to measure inpatient prescription errors, identify the most common drug errors, and implement interventions to reduce these.

Methods An enthusiastic multidisciplinary team including doctors, pharmacists, nurses and physician's assistant (to provide continuity) used The Model for Improvement to test interventions according to errors noted.

The importance of the project was communicated to all paediatric trainees (by email/face to face teaching) and ward nursing staff. Safe prescribing sessions were emphasised during induction of different junior doctor groups.

Our ward pharmacist assessed all drug charts of inpatients for two days each week collecting data on error rate and drugs involved.

PDSA cycles from April 2017 tested versions of a weekly 'Druggle' where an observed drug error was highlighted by pharmacist to all members of the ward multidisciplinary team following ward safety huddles, with interactive 'Spot the Error' sessions.

A (P) outlining the Druggle was displayed in the doctors' office and emailed weekly to junior doctors with learning points/reminders. Junior doctors designed a prescribing checklist and requested anonymised pictures of errors on (P)s.

Results There was an improvement in prescribing errors following introduction of Druggles in week 3 and a prescribing checklist in week 7, illustrated on annotated run charts for 20 weeks with 7 consecutive points below the median of 17.9%. Incorrect prescribing of Ibuprofen was responsible for 58% of wrong dose calculations in the first 12 weeks. Interventions to improve this (dedicated Druggle, email to junior doctors, nurse education), resulted in a drop to 0% in the subsequent 7 weeks.

Conclusion Identification of common prescribing errors, weekly Druggles, and empowering nursing staff to identify errors have all contributed to improved prescribing. The project is ongoing, with plans to give individual feedback on errors along with shared learning, to broaden interventions to include other specialties, and to ensure the improvements are sustained.

G375 GET SET FOR LABOUR WARD. OPTIMISING TEMPERATURE MANAGEMENT IN PRETERM INFANTS (<32 WEEKS GESTATION)

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Aim To design and implement a quality improvement project to optimise normothermia (36.5°C–37.5°C) in preterm infants on admission to neonatal intensive care (NICU).

Methods A prospective audit of admission temperatures over a 12 month period from 01/01/2016 to 31/12/2016 revealed 25 (31%) infants <32 weeks gestation were hypothermic on admission despite routine use of plastic bags and radiant heaters at delivery. A bundle of evidence based processes was compiled. These were based on NLS guidance of optimal environmental temperature, use of warmed mattresses, plastic wrapping, warmed incubators and warmed humidified gases. Also included was the American Academy of Paediatric guidance on the use continuous temperature monitoring at resuscitation. The bundle: 'Get Saturation Ecg Temperature for labour ward' was implemented following staff education, including advice on improving temperature if low on monitoring during stabilisation. A Lifestart trolley was used to deliver stabilisation with the cord intact for 60 s and monitoring was with Philips XDS monitors. Compliance with the number of process measures were recorded by questionnaire following each delivery and admission axillary temperature recorded.

Results Since implementation of Get SET in June 2017, 32 preterm infants <32 weeks have been admitted to NICU. 26 (81%) were normothermic, 4 (13%) were hypothermic and 2 (6%) were hyperthermic. 75% of the hypothermic infants had an admission temperature >36°C and no infant had an admission temperature <35.9°C (table 1). Bundle compliance was not followed in 3 out of the 4 cases of hypothermic admissions, the remaining case was a prolonged breech delivery. Bundle compliance overall was 82%.

Conclusion Quality improvement measures implemented to actively monitor and maintain temperatures in the normothermic range during stabilisation increased the proportion of preterm infants admitted with temperatures in the optimal range.

Abstract G375 Table 1 Hypothermic range before and after implementation of Get SET

Temperature range	Pre Get SET project Number of babies	Post Get SET project Number of babies
<35°C	1 (1%)	0 (0%)
35.1°C–35.5°C	1 (1%)	0 (0%)
35.6°C–36°C	7 (9%)	1 (3%)
36.1°C–36.4°C	16 (20%)	3 (9%)

G376 REDUCING PRESCRIBING ERRORS: MAKING ELECTRONIC PRESCRIBING WORK FOR OUR CHILDREN WITH CYSTIC FIBROSIS, WITH MULTI-DISCIPLINE COLLABORATION

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Aims We noted a pattern of multiple prescribing errors for cystic fibrosis (CF) inpatients, a high-risk group where poly-pharmacy is unavoidable. Errors persisted despite the introduction of electronic prescribing (EP) in our Children's hospital in 2016, and a subsequent CF prescribing care set. EP is often seen by clinicians as a fixed unalterable system contributing to rather than ameliorating errors. We wanted to demonstrate increased use of the care set alongside an expected reduction in prescribing errors, through a process of multi-disciplinary quality improvement in liaison with EP programmers.

Methods We met monthly, process mapping how the team interacts with our EP system. Sequential Plan-Do-Study-Act cycles were carried out and functionality added and optimised so they were used reliably, including care sets, automatic admission notification and judicious pop-up alerts. The National Coordinating Council for Medication Error Reporting and Prevention score (NCC MERP) was used to categorise error severity (A-I).

Results In total, 20 patients (320 medication orders) were evaluated. The most common prescribing errors were: omission of a regular medicine (27%), wrong formulation (19%) and wrong dose (14%). One third of prescriptions with error (s) were non-CF specific drugs that could not be prescribed using the care set. These errors would require different error reduction strategies to be tested and were excluded from further analysis.

Through our interventions, we demonstrated increased utilisation of the CF care set, from 42% to 70%, alongside a reduction in prescriptions with ≥1 error, from 43% to 27%. The highest severity category seen in this study (D: errors that required intervention to preclude harm, or extra monitoring) was reduced from 27% to 15%.

Conclusion It is important to recognise that clinical teams can significantly reduce medication errors, and their severity, by working closely with EP programmers to change and adapt EP functions, and evaluate their subsequent utilisation and efficacy.