7. Focus group feedback was positive that it also improved confidence.

Conclusions Discussion:

1. Important ECG parameter interpretation and documentation could be improved by implementing a checklist.
2. ECGs recorded with appropriate indications in 100% could suggest ECGs are not recorded enough. The checklist may also serve as a prompt to remind staff of the reasons to get a paediatric ECG.
3. Most abnormal and some normal ECGs get discussed with senior clinician. It may be that the checklist empowers junior staff to conduct a comprehensive evaluation prior to escalation to senior or cardiologist.
4. As with any checklist, thoroughness must be balanced against how user-friendly it is. A detailed comprehensive form may not get used because it takes too long. We believe we have struck the correct balance to assist clinicians in interpretation.

British Society of Paediatric Endocrinology and Diabetes

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ETHNIC AND SEASONAL VARIATION IN BLOODSPOT VITAMIN D AT BIRTH

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Background Vitamin D deficiency in infancy can have devastating health consequences such as hypocalcaemic seizures and dilated cardiomyopathy. It is therefore imperative to ensure adherence to national antenatal and infant supplementation policies. The effectiveness of antenatal supplementation in preventing newborn vitamin D deficiency in the UK has not been studied to date. Measuring 25 hydroxyvitamin D (25OHD) on dried blood spots (DBS) has recently emerged as a reliable method to assess population vitamin D status.

Objectives To determine the prevalence of vitamin D deficiency on DBS obtained at newborn blood spot screening (NBS) and thereby test the efficacy of the UK antenatal supplementation programme in an increasingly ethnically diverse population. To evaluate the seasonal and ethnic variation in neonatal plasma 25OHD and its determinants.

Methods 3000 random DBS samples at a single regional newborn screening laboratory (52° N) over two one-week periods, one in winter (February 2019) and one in summer (August 2019), were collected. Data was collected from NBS cards on

birth weight, gestational age, maternal age, ethnicity, and post code which was replaced with index of multiple deprivation (IMD). 25OHD concentrations were measured on 6 mm sub-punch from DBS using quantitative liquid chromatography tandem mass spectrometry adjusted to equivalent plasma values. 25OHD variation with season was assessed using Mann-Whitney U test and ethnic groups compared using Kruskal-Wallis test. Linear regression was used to assess the determinants of 25OHD concentrations.

Results 25OHD measurements were available in 2999 (1580 males) subjects [1499 winter-born and 1500 summer-born]. The majority were white British (59.1%) and born at term (mean $\pm$ SD gestational age of 38.8 ± 1.8 weeks) with a mean ($\pm$ SD) birth weight of 3306 ($\pm$ 565) grams. The overall prevalence of vitamin D deficiency [25OHD < 30 nmol/L (12 μ g/L)] was 35.7% (n = 1070) and insufficiency [30–50 nmol/L (12–20 μ g/L)] 33.7% (n = 1010). The median (IQR) 25OHD concentration was significantly lower in the winter-born compared to summer-born [29.1 (19.8, 40.6) vs 49.2 (34.3, 64.8) nmol/L respectively; p < 0.001]. Across both seasons, when compared to white British babies (41.6 nmol/L), the median 25OHD concentrations were significantly lower in babies of black (30.3 nmol/L; p < 0.001), Asian (31.3 nmol/L; p < 0.001), any other mixed (32.9 nmol/L; p < 0.001), mixed white and black (33.7 nmol/L; p < 0.05) and any other white (37.7 nmol/L; p < 0.05) ethnicity. The proportion of deficiency was also higher in babies of Asian (48%), black (47%) and mixed ethnicity (38–44%) compared to any other white (34%) or white British (30%) ethnicity.

Conclusions The current UK antenatal supplementation programme fails to protect newborns from vitamin D deficiency, especially those from minority ethnic groups. Nearly 70% of all newborns and 85% of winter-borns had 25OHD concentrations below 50 nmol/L (20 μ g/L). Almost 50% of babies of Black or Asian origin were deficient at birth. Our findings call for an immediate review of the delivery of antenatal and infant vitamin D supplementation programmes and implementation of food fortification in the long term.

Quality Improvement and Patient Safety

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WETFLAG-HDU: HOW A SIMPLE QI PROJECT CAN HAVE HIGH IMPACT

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Background Paediatric emergencies in inpatient settings can be more challenging to clinical teams than anticipated emergencies in emergency departments (EDs) or intensive care units (ICUs). In unanticipated emergencies, rapid correct calculations and good team communication are crucial. This can be a challenge as emergency drugs and defibrillation are not used commonly within inpatient practice. Use of a clinical aid memoire for medication doses has been shown to decrease the risk of errors for bolus medication significantly (G Larose et al., 2017). The WETFLAG ('Weight, Energy, Tube size, Fluid, Lorazepam, Adrenaline and Glucose') mnemonic is an aid to emergency calculations, used extensively in EDs and ICUs worldwide and taught as part of the EPALS course.

Objectives Reflecting following an unanticipated cardiac arrest in our paediatric high dependency unit (HDU) where some of the nurses needed more time to check doses, we conducted a quality improvement project to increase familiarity and use of the WETFLAG mnemonic amongst paediatric medical and nursing staff, and to assess the impact on accuracy of emergency calculations as means to minimise the communication errors and time needed to get the right doses prepared and administered in emergencies.

Methods A pre-questionnaire with a proposed clinical scenario was designed and offered to nurses, junior doctors and registrars in the paediatric department in Royal Cornwall Hospital Trust and the responses were collected anonymously during the period from April to the end of June 2020. From August 2020, we used bedside whiteboards and laminated sheets to calculate and document WETFLAG items for each admission fulfilling our local criteria for HDU care. The calculations were performed by a nurse or a junior doctor and co-signed by a senior doctor. A post-questionnaire with another proposed clinical scenario and feedback assessment were offered to the whole team in January 2021 and the data was collected and analysed anonymously. The answers were corrected to the calculated weight for each of the other equations for both the pre and post-questionnaires.

Results Thirty-four responses were collected for the pre-questionnaire including 24 nurses, 6 junior doctors and 4 registrars. For the post-questionnaire, 28 responses were collected coming from 18 nurses, 6 junior doctors and 4 registrars. Registrars despite representing a small proportion showed a good level of familiarity with the emergency calculations both before and post application of the WETFLAG tool (mean scores 96.4% and 82.14% respectively). Junior doctors showed a marked improvement in knowledge represented by an improvement of mean score from 35.7% before the project to 73.8% afterwards. Nurses showed a variable knowledge base before applying the tool scoring a mean of 73.2% on the pre-questionnaire. They scored higher on the post-questionnaire with a mean score of 94.44%. As feedback, 100% of the team members responding to the survey found the WETFLAG tool to be useful in emergency settings and 97% of them found it useful as a teaching tool.

Conclusion The WETFLAG HDU QI project showed improvement in the uniform knowledge base and confidence with emergency doses among the different members of the paediatric team.

British Association of Perinatal Medicine and Neonatal Society

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USE OF X-RAY INVESTIGATION TO DEFINE LONGLINE TIP (PERIPHERALLY INSERTED CENTRAL CATHETER) IN NEONATES

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Background Longlines are widely used on neonatal units for long term venous access for administration of parenteral

nutrition and cardio active drugs in vulnerable neonates. X-ray investigation, either plain or with contrast, is used to define the tip of longline position to ensure safe placement of catheter. Higher mitotic activity, greater radio sensitivity and longer life time for the consequence to manifest makes a preterm infant more vulnerable to radiation damage.¹

Objectives

- To identify number of X-rays done to define longline position tip in a neonate admitted to neonatal unit at St. George's Hospital NHS Foundation Trust
- To identify factors influencing need for more than one X-ray to define longline position
- To assess relationship between sub optimally placed longline and complications associated with longline

Methods A retrospective audit including babies requiring longlines during admission to St. George's Hospital Neonatal Unit, a tertiary surgical neonatal unit in the United Kingdom, from August 2016 to January 2020. Information was extracted from prospectively collected data (electronic neonatal database, Badgernet UK). A single observer reviewed all X-Rays that were performed to define longline position.

Standard: X-ray exposure of vulnerable neonates should be kept to a minimum, and ideally to a single exposure when confirming long line position, whilst ensuring safe position of the device.

Definition of optimally placed longline:

For Upper limb and scalp: Longline visible on CXR with tip medial to lateral 1/3rd of clavicle and outside cardiac silhouette

For lower limb: Longline visible on AXR. Left leg longline-Crossing midline with tip at level of L3 and outside cardiac silhouette

Results A total of 552 longlines for 361 babies with median gestational age 28 weeks (23–41+5) and median birthweight 1366 grams (350–4894) were reviewed. Nearly half of the long lines (311–56%) were inserted for medical indications. The day of insertion ranged from soon after birth up to 194 days of life. More than half (327–59%) longlines needed adjustment after insertion. Almost 20% (93) of longlines were used despite suboptimal position. Insertion site in the upper limb (odds ratio 4.5 CI 3.06 TO 6.6 P<0.001), corrected gestation >28 weeks at the time of insertion (odds ratio 1.45 CI 1.1 to 2.08 P<0.043), highly experienced operator (Odds ratio 1.4 CI 1 to 2.03 P=0.05) were associated with the need for more than one X-ray to define longline position. Complication rates associated with longline in a suboptimal position were higher compared to long lines with an optimal position (odds ratio 1.75 CI 1.06 to 2.86 P=0.027).

Conclusions More than half of longlines inserted required two or more x-rays to confirm final optimal position. Long lines in upper limbs, babies with corrected gestation (>28 weeks) and highly experienced operator were associated with need for > 1 X-Ray to define the position. Sub optimally placed longlines are more likely to be associated with device complications.

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