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**P002** **MEDICINE USE AND OPTIMISATION FOR CHILDREN AND YOUNG ADULTS AGED 0–18 YEARS OLD – MEDICATION ADMINISTRATION AND ADHERENCE OF PARENT/CAREGIVER AND CHILD**

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**Aim** To systematically review all published evidence related to medication administration accuracy and its relation to improving medication adherence among paediatric population. The objectives are to identify, the main issues and challenges that the patients or their parents, caregivers or healthcare professionals face when administering or taking a medication any published methods or tools that improves medication administration accuracy and adherence among the paediatric population; and the health literacy and knowledge of parents/caregivers/healthcare professionals concerning medication administration.

**Methods** A systematic search of the literature to identify any related studies to medication administration among paediatrics was performed using the following bibliographic databases: PubMed, Scopus and Cochrane Library. The list of various synonyms of the keywords was defined following the PICOC model and a discussion between the authors. An information specialist was contacted to ensure the accuracy of the developed search terms. Search terms included a list of synonyms relating to i) paediatric ii) medication administration accuracy iii) medication adherence and iv) medication error. The search was limited to studies published in English. Only studies that report paediatric patients aged from 0 up to 18 years of age who are prescribed medication that requires administration by the parent, caregiver or themselves were included. Studies including mixed paediatric and adults were further investigated and data related to paediatric were extracted. Quality assessment will be integrated into the review process using 'CASP' checklist at the data extraction stage.<sup>1</sup> The study protocol was registered on PROSPERO.

**Results** All databases were systematically searched (in April 2018). Overall, 1,018 citations were found; of which 994 remained after removal of duplicates. After screening of titles and abstracts, 46 studies were considered eligible for inclusion in this review. At data extraction stage, 12 studies were excluded, owing to the lack of paediatric specific information or medication-related errors. 34 studies were further investigated, among which, 30 (30/34, 88.2%) studies reported that dosing errors are the most common type of medication errors and are associated with parents or caregivers with inadequate health literacy. Over-the-counter liquid medications and antibiotics are commonly associated with dosing errors among parents and caregivers. Two (2/26, 7.7%) experimental studies indicated that both droppers and cups are the prime causes of dosing errors that occur via parents. Two (2/34, 5.9%) review studies indicated that medication administration errors are common among children with prescribed inhalers. Finally, two (2/34, 5.9%) observational studies identified that labels and information sheets of the medication contribute to medication administration errors.

**Conclusion** The preliminary findings of this review suggest that further integrated education strategies between healthcare-professionals and parents or caregivers is a priority to reduce medication administration and dosing errors among children and young adults. To our knowledge, limited studies were conducted in the UK about this topic, hence, further work is required to highlight the issue of medication errors among children and its association with parents or caregivers health literacy in the UK.

**REFERENCES**

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**P003** **INTERMITTENT VANCOMYCIN IN PAEDIATRICS: IMPLEMENTATION AND AUDIT OF A NEW GUIDELINE**

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**Aim** A guideline for the use of intermittent intravenous vancomycin in children was designed and implemented in our Trust in 2016. This introduced the use of a loading dose, increased dosing and increased frequency compared to the BNFC recommendations. The changes were based on the outcomes of a national NPPG project and local focus groups. The aim of this audit was assess compliance with the guideline and to establish if the time taken to reach target vancomycin levels had been reduced as a result of using the new guidance.

**Methods** 30 paediatric patients ( $\geq 1$  month old) prescribed intermittent intravenous infusions of vancomycin were identified by ward pharmacists over a 2 month data collection period. 4 patients required treatment with adult dosing due to their weight. 2 patients were switched onto continuous infusion following pharmacist intervention. The results of the remaining 24 patients were compiled into an excel spreadsheet for analysis.

**Results** Audit pre-implementation of the guideline had highlighted the lack of a support for staff to use appropriate dosing and monitoring.<sup>1</sup> Overall, usage of the new guideline was positive. The loading dose was used appropriately in 83% patients. Levels were taken at appropriate times in 90% patients. The percentage of levels in therapeutic range at 48 hours increased from 7% to 40%. 100% of patient had a review at this time. Half of the patients out of range at 48 hours had treatment stopped or changed to a more appropriate treatment, reducing the need for unnecessary complex dose adjustment/monitoring plans. At 48 hours, there remained 30% of the total patient group requiring dose adjustment in order continue vancomycin treatment. The main area of concern was that review of these out of range levels was only carried out in accordance with the guideline in 40% of cases. This was improved to 80% with pharmacist intervention. A limitation of this data was the small patient group size. One patient had the level taken at the wrong time so could not be interpreted properly.

**Conclusion** Compliance with the new guideline was good overall. This audit has shown that the use of the new guideline improved the percentage of patients with vancomycin levels in range at 48 hours from 7 to 40%. The main theme from this audit was that pharmacist intervention was the key to directing the medical teams towards prescribing the most appropriate form of treatment. Education can only improve

compliance to a certain degree and this drug is not used often enough to be familiar to the average junior doctor. The use of vancomycin in complex and requires an understanding of pharmacokinetics and drug handling unique to the pharmacist skill set. Our aim for the future is that as our pharmacist team acquires more independent prescribers, direct adjustment of treatment plans will become a pharmacist role within the Trust.

#### REFERENCE

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P004

#### AN EVALUATION OF THE MANAGEMENT OF THROMBOSIS IN NEONATES AND INFANTS USING DALTEPARIN

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**Aim** To assess the safety and efficacy of the current dalteparin dosing recommendations in achieving therapeutic anti-Xa levels, when used for the treatment of thrombosis in neonates and infants. The objectives included: To assess the number of neonates/infants administered dalteparin for thrombotic events To evaluate how many neonates/infants achieved a therapeutic anti-Xa level (4 hour post-dose level of 0.5–1 unit/ml) To measure the duration between starting dalteparin and achieving a therapeutic anti-Xa level.

**Methods** Retrospective electronic searches were conducted to identify neonates and children prescribed and administered dalteparin between January 2016 and October 2017. These included reports from the JAC pharmacy dispensing programme, Medchart (electronic prescription chart) and Omnicell (ward electronic medicines storage system). A data collection form was designed using Excel, and piloted on a few randomly selected patients. Following the pilot, appropriate changes were made to the form. Inclusion criteria included: Treatment doses of dalteparin Neonates/infants under 12 months age Exclusion criteria included: Dalteparin thromboprophylaxis Missing data e.g. no anti-Xa levels recorded Patients were started on dalteparin using the dosing recommendations outlined in the dalteparin monograph in the Hospital paediatric formulary and the Trust's Paediatric thrombosis guideline: 150 units/kg twice a day for babies under 5 kg 100 units/kg twice a day for babies over 5kg Doses that achieved therapeutic peak anti-Xa levels (4 hour post dose level of 0.5–1 unit/ml) were obtained by analysing the patient's Medchart (electronic prescription chart) and electronic patient record (EPR). The duration between receiving an initial dose of dalteparin and achieving a therapeutic anti-Xa concentration was recorded to evaluate clinical effectiveness. Creatinine, urea and platelet measurements were analysed to assess the safety of dalteparin, as dalteparin can accumulate in patients with renal impairment, and thrombocytopenia is a common side-effect.

**Results** A total of 25 patients were included in the study: 18 neonates and 7 infants. In the neonatal group, ages ranged from 32 weeks preterm to 42 days post term delivery. The median age at time of dalteparin administration was 15 days. Weights ranged from 1.8 kg to 4.2 kg. In the infant group, ages ranged from 2 to 11 months. Weights ranged from 3.2 kg to 11.7 kg. 100% (25/25) patients achieved a therapeutic

anti-Xa level; however, 100% (25/25) patients required dose adjustments to reach these levels. The mean dose required to reach therapeutic anti-Xa levels in neonates and infants was 250 units/kg ( $\pm 60$ ) and 140 units/kg ( $\pm 50$ ), respectively. In neonates, the duration between initial dalteparin administration and achieving therapeutic anti-Xa levels ranged from 2–8 days. In 8/18 (44%) patients, it took a minimum 5 days to achieve therapeutic anti-Xa levels. No episodes of renal impairment or thrombocytopenia were observed.

**Conclusion** Dalteparin was successful in achieving therapeutic anti-Xa levels in neonates and infants following cumulative dose increases from the initial dose. The initial recommended dose of dalteparin for neonates is too low and should be increased to 250 units/kg achieve therapeutic anti-Xa levels quicker, and to minimise the need for numerous blood tests and dose adjustments. Further studies are required to verify these results, due to the small patient numbers.

P005

#### DIPHTHERIA TREATMENT

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**Background** Diphtheria is a life threatening but vaccine preventable disease. 5 cases were identified by Public Health England (PHE) in 2017.<sup>1</sup> Respiratory diphtheria is characterised by a pseudomembrane which obstructs the airways. Corynebacterium diphtheria produces an exotoxin that causes local tissue necrosis, myocarditis, polyneuropathy, paralysis, respiratory failure and death.

**Clinical case** A 4 year old boy was admitted via A&E with suspected croup requiring intubation and ventilation on intensive care unit (ICU). Throat swabs confirmed diphtheria diagnosis, PHE was contacted and diphtheria antitoxin was obtained. The patient received two subcutaneous doses of diphtheria-antitoxin. He developed myocarditis, Acute Kidney Injury (AKI), impaired left ventricular function and polyneuropathy. He was treated with 14 days intravenous vancomycin and clindamycin following multiple antibiotic changes.

**Pharmacy contribution** Anti-toxin: Diphtheria anti-toxin was obtained and advice was provided regarding an appropriate dose and route of administration. Ward staff were reluctant to give a subcutaneous infusion. A pharmacist provided reassurance that this was the only way to treat the infection and a subcutaneous cannula was inserted. He was given 0.2 ml subcutaneously as a test dose followed by the remaining 40,000 units. His second dose was given as a test dose of 0.2 ml followed by 60,000 units between two sites due to multi-organ involvement. Chemoprophylaxis: The patient's family and 34 staff members required prophylactic antibiotics. They received azithromycin 500 mg once daily for 3 days. Staff members had throat swabs and were to remain off work until these swabs were negative which resulted in the Trust cancelling elective operations and admissions. Pharmacy confirmed azithromycin was safe for 34 adult patients and checked for interactions with currently prescribed medicines and advised appropriately.

**Critical care** Creatinine doubled and the pharmacist reviewed drugs to account for renal impairment. The pharmacist highlighted that clarithromycin can prolong QT interval. An echocardiogram revealed the patient had prolonged QT interval and clarithromycin was switched to an alternative after discussion with the microbiologist.