titration at our hospital is made twice a year and anti-HBs level needed are 30 to 50 IU/mL. Hepatitis A is a recommended vaccine for risk population including haemodialysis patients and chronic kidney disease patients. The vaccination schedule is the same for haemodialysis patients with two doses but the second dose is administered earlier, i.e. six months after the first with an antibody screening. For the pneumococcal vaccine, an additional dose is administered at 3 month of age for premature and at risk children and the conjugated vaccine potentiates the polyosidic vaccine. For measles, the second dose may be omitted if the antibody titration confirms the protection to allow the patient to be registered earlier on the renal transplant list. Flu vaccination is recommended with the same dose and schedule that the other patients, but tetra-valent vaccines should always be chosen.

Conclusions Children with chronic kidney disease or on haemodialysis are more at risk of vaccine preventable infectious diseases and should be vaccinated earlier before beginning dialysis. The specific immunization schedule will be presented and may be used by other hospital and countries for concerned patients.

REFERENCES

1. Bakkaloğlu SA, et al. Vaccination Practices in Pediatric Dialysis Patients Across Europe. A European Pediatric Dialysis Working Group and European Society for Pediatric Nephrology Dialysis Working Group Study. *Nephron* 2018;**138**:280–286.
2. Costa NCP, da Canhestro MR, Soares CMBM & Rodrigues JS. Monitoring of post-vaccination anti-HBs titres vaccine in children and adolescents in the pre-dialysis of chronic kidney disease. *Braz. J. Nephrol.* 2017;**39**:296–304.
3. DGS_Anne.M, DICOM_Jocelyne.M, DGS_Anne.M & DICOM_Jocelyne.M. Le calendrier vaccinal. *Ministère des Solidarités et de la Santé* (2019). Available at: <https://solidarites-sante.gouv.fr/prevention-en-sante/preserver-sa-sante/vaccination/calendrier-vaccinal> (Accessed: 28th June 2019)
4. Misurac JM, et al. Immunogenicity of augmented compared with standard dose hepatitis B vaccine in pediatric patients on dialysis: a midwest pediatric nephrology consortium study. *Clin. J. Am. Soc. Nephrol* 2017;**12**:772–778.

P45

ENOXAPARIN AND TINZAPARIN IN PEDIATRICS: IMPACT OF PRESCRIPTION RECOMMENDATIONS ON PRESCRIPTION QUALITY AND ANTI-XA LEVELS

¹Julie Noailly, ¹Lailly Sadozai, ²Marie-Françoise Hurtaud-Roux, ³Jérôme Naudin, ⁴Ronan Bonnefoy, ⁵Caroline Farnoux, ⁶Thérèse Kwon, ⁷Olivier Bourdon, ⁸Sonia Prot-Labarthe*. ¹Service de Pharmacie, AP-HP, Hôpital Robert-Debré, Paris, France; ²Service d'Hématologie, AP-HP, Hôpital Robert-Debré, Paris, France; ³Service de Réanimation Pédiatrique, AP-HP, Hôpital Robert-Debré, Paris, France; ⁴Service de Cardiologie Pédiatrique, AP-HP, Hôpital Robert-Debré, Paris, France; ⁵Service de Néonatalogie, AP-HP, Hôpital Robert-Debré, Paris, France; ⁶Service de Néphrologie Pédiatrique, AP-HP, Hôpital Robert-Debré, Paris, France; ⁷Service de Pharmacie, AP-HP, Hôpital Robert-Debré, Département de pharmacie clinique, Université Paris Descartes, Paris, France; ⁸Service de Pharmacie, AP-HP, Hôpital Robert-Debré, Université de Paris, ECEVE, Inserm, Paris, France

10.1136/archdischild-2020-NPPG.54

Aims Enoxaparin and tinzaparin, two low-molecular-weight heparins (LMWH), are used in paediatrics with multiples advantages such as facility of administration, reduced frequency of side effects, reduced drug interaction. However, their use is at higher risk of error in prescription, dosage, dilution or administration.¹ The monitoring of efficacy is based on the dosage of anti-Xa level with a target between 0.5 and 1 IU/mL (0.4 to 1.2 IU/mL tolerated in our hospital).^{2,3,4} This dosage is performed on a routine basis in patients with curative treatment. A protocol was written by a multidisciplinary team (nephrologist, neonatologist, haematologist, cardiologist, paediatrician and pharmacist) in order to standardize the prescriptions of LMWH within the hospital

for patients aged between 0 and 18. The aim of this study consists in the analysis of prescriptions of enoxaparin and tinzaparin and the anti-Xa levels before/after the dissemination of the protocol during the summer of 2017.

Methods This is a retrospective observational study in our mother-child teaching hospital in France. Any patient hospitalized in 2016 and 2018 and who received a prescription for enoxaparin or tinzaparin was included in the study. Exclusion criteria were: patients hospitalized in obstetrics and gynaecology and patients over 18 years old. Prescribing throughout the hospital is computerized and involves PCS® software (IBM, Armonk, NY, USA). Data collected concerned the patient (age, weight, first anti-Xa level, unit), the drug prescribed (dosage expressed in IU, first dosage expressed in IU/kg depending on the patient's age and/or weight, the frequency of administration and the dilution when necessary and if it is conform to the protocol). This study has been approved by our ethics review board in March 2019.

Results In 2016 2,246 prescriptions for 630 patients were analyzed (601 patients had only enoxaparin, 7 only tinzaparin and 22 had a switch between the two heparins). In 2018 we studied 2,061 prescriptions for 629 patients (591 patients had only enoxaparin, 10 only tinzaparin and 28 had a switch). The conformity was improved concerning the first dose expressed in IU/kg (34.8% then 52.1% for enoxaparin and 69.2% then 80.0% for tinzaparin), the dosage and frequency (28.7% then 43.8% for enoxaparin and 69.2% then 80.0% for tinzaparin), the dilution specified (66.7% then 73.1%) and the dilution conform to protocol (29.4% then 66.4%). However, we observed a slight decrease in the conformity concerning the unit in IU/administration (84.5% then 80.2%) with dose expressed in mL, mg or 'referred to protocol'. The rate of conform first anti-Xa levels (between 0.4 and 1.2 IU/mL) improved from 26.6% among 158 dosages in 2016 to 44.1% among 118 dosages in 2018.

Conclusions The overall results show an improvement in the prescription of enoxaparin and tinzaparin and in the anti-Xa levels since the dissemination of the protocol for prescribing physicians. This whole protocol will be presented in the poster and may be used by other hospitals.

REFERENCES

1. Fanikos J, Stapinski C, Koo S, et al. Medication errors associated with anticoagulant therapy in the hospital. *Am J Cardiol* 2004;**94**:532–535.
2. Monagle P, Chan AKC, Goldenberg NA, et al. Antithrombotic therapy in neonates and children: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines, *Chest*. 2012;**141**:e737S–e801S.
3. Andrade-Campos MM, Montes-Limón AE, Fernandez-Mosteirin N, et al. Dosing and monitoring of enoxaparin therapy in children: experience in a tertiary care hospital. *Blood Coagul Fibrinolysis. Int J Haemost Thromb* 2013;**24**:194–8.
4. Ahuja TM, Mousavi L, Klejmont, et al. Enoxaparin dosing and antiXa monitoring in specialty populations: a case series of renal-impaired, extremes of body weight, pregnant, and pediatric patients. *J Formul Manag* 2018;**43**:609–614.

P46

DOSE-BANDING LIMITS FOR COMMONLY PRESCRIBED MEDICATIONS FOR CHILDREN IN THE UK

¹Asia N Rashed, ²Stephen Tomlin*. ¹King's College London, UK; ²Evelina London Children's Hospital, Guy's and St Thomas' NHS Foundation Trust, UK; ²Great Ormond Street Hospital for Children NHS Foundation Trust, UK

10.1136/archdischild-2020-NPPG.55

Aim Currently, majority of prescribed medication doses are calculated according to a child's body weight without

considering the available drug products for administration or the therapeutic range of the drug. This can lead to lack of consistency in dosing and drug administration errors, which affects many children of all ages treated with medicines.¹ There are no established standards for dose-banding in national or international healthcare systems. This project aimed to establish dose-banding limits for paediatric medicines, to be used for prescribing and administering accurate, safe, and effective drug doses.

Method A list of the most common oral prescribed medications was established from the medication dispensing database of four hospitals in the UK. Then the evidence for safe and effective dose ranges for each drug on the list was identified from paediatric reference books, Summary of Product Characteristics (SPC) and published literature. After using these data to develop dose bands based on body weight, we used a Delphi process to achieve healthcare professionals' consensus about the suggested dose bands for each drug on the list.

Results A total of 45 drugs for 45 specific indications were included. Four categories of dose-banding limits were established; drugs with 2-weight bands; 3-weight bands; 4-weight bands and 5-weight bands. Overall, for 53.3% (24/45) of the included drug, all their suggested dose-banding limits reached consensus after two rounds of Delphi. For 92% (22/24) of them, consensus was achieved on all their suggested bands in the first round. Only for 2 drugs the agreement was achieved after the second round. For the drugs included in 2-weight band and 5-weight band categories, all their suggested dose-banding limits received total consensus after round 1 of the Delphi process. For 9 drugs included in the 4-weight bands category, the agreement was achieved only on either one or two of their suggested dose bands. For 12 drugs, no agreement was reached on any of their suggested bands.

Conclusion The study results provide healthcare professionals with a set of recommended dose-banding limits for commonly prescribed drugs in the UK. These recommended limits could establish the basis for change in clinical practice to improve health care provided for children.

Acknowledgement This work is part of a larger project funded by the Neonatal and Paediatric Pharmacists Group.

REFERENCE

1. Rashed AN, Tomlin S, Arenas-López S, et al. Evaluation of the practice of dose-rounding in paediatrics. *Int J Pharm Pract* 2019 May 29. doi:10.1111/ijpp.12549. [Epub ahead of print]

P47

EXTENT OF PAEDIATRIC EXPOSURE TO PHARMACEUTICAL EXCIPIENTS: AN EXPLORATORY STUDY

¹Mohammed AbouDaya*, ²Stephen Tomlin, ³Asia N Rashed. ¹Evelina London Children's Hospital, Guy's and St Thomas' NHS Foundation Trust, UK; ²Great Ormond Street Hospital for Children NHS Foundation Trust, UK; ³King's College London, UK; Evelina London Children's Hospital, Guy's and St Thomas' NHS Foundation Trust, UK

10.1136/archdischild-2020-NPPG.56

Aim The assumption that excipients are inactive therefore non-harmful to patients is a declining opinion due to raised safety concerns of excipient activity, particularly in children.¹ There is limited data on the safety of excipients in children and a lack of standardisation of the risk-benefit use of excipients in the different paediatric populations.² This study aimed to investigate the extent of excipient exposure

in children taking long-term oral liquids, admitted to Hospital, and to identify whether patients could be switched to a solid alternative due to the harm posed from liquid formulations.

Method A prospective observational study conducted in a UK paediatric hospital. The electronic medication chart for hospitalised children aged 0–18 years on long-term (for ≥6 weeks) oral liquid medicines, were reviewed over a four-week period. A priority list of eight excipients (called harmful excipients) with known reported hazards was developed based on literature: propylene glycol, ethanol, parabens, benzyl alcohol, aspartame, sorbitol, polysorbate 80 and benzoic acid. The list was used to determine the extent of children exposure to the harmful excipients. Considering patient factors (age, swallowing ability, treated condition), prescribed dose and availability of solid dosage forms, the included long-term liquid medicines were assessed for a potential solid form alternative by a specialist paediatric clinical pharmacist.

Results A total of 302 oral liquid medicine formulations prescribed for 60 patients (age range 10 days – 17 years) were included in the study, of which 68.9% (208/302) were long-term oral liquid formulations. The 208 oral liquid formulation contained a total of 1044 excipients resulted in 17.4 (± 9) excipients per patients. Majority of patients (98.3%, 59/60) were exposed to at least one harmful excipient in their medicines. Children aged 2–11 years and 6–11 years were exposed the most to harmful excipients (mean 8.2 ± 4.9 exposure per patient). Parabens (81.7%, 49/60) was the most common harmful excipient patients were exposed to, followed by sorbitol (76.7%, 46/60), ethanol (75.0%, 45/60) and propylene glycol (70.0%, 42/60). Considering patient factors, prescribed dose and availability of solid formulations, it was found that almost third of the prescribed long-term oral liquid medicines (33.0%, 68/208) could be switched to tablet or capsule forms by pharmacist without any change to the prescribed dose. While for another 3.4% (7/208) long-term liquid medicines could be switched to solid dosage forms with prescriber approval, as prescribed doses would need to be adjusted slightly.

Conclusion The study highlights the extent of excipients exposure in children on long-term oral liquid medicines, many of which could potentially be harmful. Healthcare professionals should aim to reduce the long-term risks of excipients by providing an oral solid substitute to replace oral liquid formulation, where possible, and ensuring excipients are within safe, acceptable limits.

REFERENCES

1. Fabiano V, Mameli C, Zuccotti GV. Paediatric pharmacology: remember the excipients. *Pharmacol Res* 2011; **63**:362–365.
2. Buckley L, Salunke S, Thompson K, et al. Challenges and strategies to facilitate formulation development of pediatric drug products: Safety qualification of excipients. *Int J Pharm* 2018; **536**:563–569.

P48

AN AUDIT OF COMPLIANCE OF AGE AND CRITICAL DRUG RELATED MONITORING CRITERIA/REQUIREMENTS FOR PATIENTS RECEIVING CARBOPLATIN DOSES WITH THERAPEUTIC PHARMACOKINETIC DRUG MONITORING

Lamia Samrin-Balch*, Cindy Cheng. Great Ormond Street, London

10.1136/archdischild-2020-NPPG.57

Aim To determine the level of compliance to age and critical drug monitoring parameters required for patients receiving