suppliers and manufacturers, or to seek supplies abroad, in order to guarantee treatment of patients.

Aim and objectives To analyse DS that affected a second level hospital over 1 year (March 2018 to March 2019) and to describe measures taken by the hospital pharmacist to deal with them.

Material and methods This was a descriptive, observational, retrospective study of DS over a 1 year period. A list of all DS that affected our hospital was obtained from the Spanish Agency for Medicines and Health Products (AEMPS) webpage and from calling laboratories when medications were delayed. Variables collected were: drugs involved, therapeutic group according to the anatomic, therapeutic, chemical (ATC) classification system and pharmaceutical actions to solve DS.

Results During the study period, 172 DS affected our hospital. Eight (4.7%) were not notified to the AEMPS. According to the ATC classification system, the main groups affected were: antimetabolites (7%; ATC-L01B), corticosteroids for systemic use (4.7%; ATC-H02A), antiarrhythmics, classes I and III (4.1%; ATC-C01B), antipsychotics (2.9%; ATC-N05A) and all other therapeutic products (2.9%; ATC-V03A). The strategies for management of these DS were changing the supplier (37.8%), buying a different packaging (11%), foreign medicine importation through AEMPS authorisation (8.7%), using a therapeutic alternative (4.1%), restricting use of available stock according to clinical criteria (2.9%) and performing a magistral formula (1.2%). In the remaining 34.3% of cases, no action was needed.

Conclusion and relevance Currently, we are forced to deal with a large number of DS. Antimetabolites, systemic corticosteroids and class I and III antiarrhythmics were the main ATC groups affected. In most cases, it was possible to change laboratory and change the packaging. DS affect every level of the healthcare system, compromising standards of care. Because of this, it is important to coordinate different health services in order to take adequate measures to face shortages, without risking patient safety.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest.

2SPD-027 ECONOMIC IMPACT OF DRUG SHORTAGES

C Aparicio Carreño, Y Labeaga Beramendi, B Rodríguez*, B Fernández González, A Gándara Ande, FJ Barbazán Vázquez, C Martínez-Múgica Barbosa, C Durán Román. *Cabueñes Hospital University, Pharmacy, Gijón, Spain*

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Background and importance Drug shortages is an international problem, which is increasingly frequent, and has a huge impact on healthcare systems.

Aim and objectives To quantify the economic implications of drug shortages in acute care hospitals.

Material and methods A retrospective descriptive study was conducted from January 2018 to March 2019. Shortages were defined as shortcomings in the supply of a medicinal product that affected the patient's ability to access the required treatment in due time. Costs from management of drug shortages were calculated as the difference between the acquisition cost of the original medicine immediately prior to its start and the alternative drug (bought from compounding pharmacies when raw material was available or temporarily imported when it was still available in other countries in the EU).

Abstract 2SPD-027 Table 1 Drugs involved in shortages

Drug	Total cost (€)
Piperacillin/tazobactam injection 4/0.5 g	47 590.40
Alprostadil injection 20 µg	15 815.80
Dexchlorpheniramine injection 5 mg	10 632.80
BCG strain Tice 2–8 × 10 ⁸ UFC intravesical	5427.29
Phytomenadione injection 10 mg	5335.50
Magnesium sulphate injection 1.5 g	2828.40
Clorazepate dipotassium injection 20 mg	1393.60
Metoclopramide injection 10 mg	1248.00
Sodium Chloride injection 20% 10 mL	650.00
Doxycycline injection 100 mg	568.50
Isoniazid/pyrazinamide/rifampicin 50/300/120 mg tablets	60.84

Results During the study period, 11 medicines were involved in drug shortages (table 1).

There were 19 new suppliers: 5 were compounding pharmacies and 14 were international manufacturers. An alternative drug with the same active substance was imported in all cases but 1, dexchlorpheniramine injection 5 mg, which was switched to an equivalent drug (chlorpheniramine injection 10 mg).

All alternatives caused an increase in the price of acquisition compared with the original medicine, except for two (intravesical BCG and one of the alprostadil suppliers), where the price remained unaltered. The average increase in price was 4.28€ per unit (range 0–25€) which represented an average increase of 409.2%.

Total cost of purchases due to shortages was 91 551.13€ (79% accounting for the acquisition of three drugs: alprostadil, chlorpheniramine and piperacillin/tazobactam). This resulted in an increase of 67 607.19€ on the hypothetical price calculated from regular suppliers.

Conclusion and relevance The results suggest that shortages significantly increase the acquisition cost of pharmaceuticals in hospitals. Strategies to minimise the effects of drug shortages should be implemented.

REFERENCES AND/OR ACKNOWLEDGEMENTS

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2SPD-028 REFERENCING A MIDLINE: HOW TO MAKE A CHOICE?

¹P Behague*, ¹M Debailleul, ²L Lampe, ²N Garnier, ³V Colas, ¹M Raoult, ¹F Cathelineau, ¹N Guenault, ²V Leclercq, ³C Canevet, ¹E Floret. ¹Hôpital Saint Philibert, Service Pharmacie, Lomme, France; ²Hôpital Saint Philibert, Equipe Opérationnelle D'hygiène, Lomme, France; ³Hôpital Saint Philibert, Service D'anesthésie, Lomme, France

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Background and importance Midlines, peripheral venous catheters, allow prolonged administration of intravenous therapy to patients with low venous capital. It is essential to test them to limit further misuse or complications as part of the tendering procedure.

Aim and objectives To assess if two midlines met the expectations of medical teams and improved patient care.

Material and methods A prospective evaluation was done with Smartmidline (Vygon, G1) and ArrowMidline (Teleflex, G2) for 4 months. Midlines are given by name and placed in the operating room using a Seldinger technique.

Information to nurse care services was delivered by a pharmacy intern and a public health nurse after each insertion and during changes in dressings. Medical criteria (indications, complications, catheter operating times and removal reasons) and handling criteria (evaluation sheet by installers) were listed.

Results Mean age was 74 ± 15 years (G1) and 70 ± 17 years (G2). There were seven successful insertions and three failures due to venous access difficulties in G1; there were eight insertions in G2. Midlines were placed by anaesthetist (94% of cases) for antibiotic therapy or nutrition.

Median catheter use duration was 7 (2–24) days for G1 and 15.5 (1–65) days for G2. The reasons for withdrawal were: end of treatment (28.6% G1, 37.5% G2), accidental withdrawal by the patient (28.6% G1, 12.5% G2), thrombosis (14.3% G1), clogged catheter (12.5% G2), death (12.5% G2) and worsening of health (14.3% G1).

Positive opinions were expressed regarding the length of the catheter (100% G1 vs 33% G2) and ease of installation (86% G1 vs 67% G2). Comments were made for G1 (“rigid guide”) and for G2 (“complexity of handling a peel-away sheath”); 80% of installers who tested both devices preferred the Smartmidline.

Conclusion and relevance The various clinical situations and small number of patients made the medical criteria not relevant to make a choice. The handling criteria and practicality of the Smartmidline, as evaluated by caregivers, led to its recommendation. To secure its use, a hygiene protocol has been implemented in the hospital. To facilitate the interface between hospital and community carers, instructions for patients, doctors and pharmacists have to be reinforced.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest.

Section 3: Production and Compounding

3PC-001

COMPATIBILITY AND STABILITY ASSESSMENT OF A SODIUM GLYCEROPHOSPHATE FORMULATION MIXED IN BAGS FOR NEONATAL TOTAL PARENTERAL NUTRITION

¹A Isoardo*, ¹E Grande, ¹MM Ferrero, ¹M Viglione, ²B Rolando, ²R Fruttero, ¹C Fruttero. ¹Ao S Croce E Carle, SC Farmacia Ospedaliera, Cuneo, Italy; ²Università Degli Studi Di Torino, Dipartimento Di Scienza E Tecnologia Del Farmaco, Torino, Italy

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Background and importance At the end of 2018 there was a shortage and withdrawal from the market of D-fructose-1,6-diphosphate (Esafosfina), a phosphate source for the extemporaneous preparation of bags for neonatal total parenteral nutrition (TPN). Therefore, a solution of sodium glycerophosphate (Natriumglycerophosphat-Ampulle Fresenius) was imported from abroad. This solution is different because it contains L-malic acid as an excipient. No stability data on Natriumglycerophosphat-Ampulle Fresenius in TPN bags were found in the literature.

Aim and objectives To test the compatibility and stability of Natriumglycerophosphat-Ampulle Fresenius in TPN bags we prepared.

Material and methods Neonatal TPN formulations are customised: therefore, we identified three test formulations, with

varying concentrations of phosphate, calcium and magnesium (critical components), with and without lipids. Turbidity and pH controls were planned at appropriate time intervals (0, 24, 48, 72 and 96 hours after preparation) and under different storage conditions (room temperature, refrigerated and at 37°C). These controls were performed either with lipid free or with all in one formulations (all components, including lipids, are mixed in the same bag).

Results In lipid free formulations there was no formation of a precipitate at room temperature or under refrigerated conditions. The absorbance of the solutions at 600 nm (turbidity reading) remained below 0.010, which means no evidence of precipitation. There was precipitate formation under storage condition at 37°C (after 72 hours in test bags No1 and No2 and after 96 hours in bag No 3). The determining factors of the formation of this precipitate are alteration and degradation of the amino acids and the resulting pH reduction. In all in one formulations, we assessed stability with a microscope. Coalescence started in a bag 48 hours after preparation. Solution pH ranged from 5.5 to 6.5.

Conclusion and relevance Sodium glycerophosphate (Natriumglycerophosphat-Ampulle Fresenius) can be mixed with the usual components for neonatal TPN. In the test formulations there was no physical or chemical incompatibility. Lipid free formulations were stable for at least 96 hours. All in one formulations should be infused within 24 hours, especially if the amount of lipids is high.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest.

3PC-002

MICROBIOLOGICAL STABILITY TEST OF 15% TOPICAL RESORCINOL FOR QUALITY CONTROL

¹J Cordero-Ramos, ²M Delgado-Valverde, ¹V Merino-Bohórquez, ¹C Castillo-Martin*, ¹FJ Falcón-Rodríguez, ¹M Cameán-Fernández. ¹Hospital Universitario Virgen Macarena, Hospital Pharmacy, Seville, Spain; ²Hospital Universitario Virgen Macarena, Microbiology Department, Seville, Spain

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Background and importance Hidradenitis suppurativa (HS) is an inflammatory skin disease that causes painful boils and abscess formation, especially localised in intertriginous areas. Resorcinol is a phenol derivate, and in topical self-treatment decreases the size and pain of HS lesions.

Topical 15% resorcinol is prepared as a pharmaceutical compound and there are no data in the current literature on the microbiological stability of formulations of topical resorcinol 15%. The European Pharmacopoeia (EP) established acceptance criteria (chapter 5.1.4) for microbiological quality control of the compound. Previous to the microbiological quality assay, the EP also established the necessity of a suitability test of the method.

Aim and objectives The objective of the study was to develop a microbiological growth assay to perform a microbiological stability test for quality control of this resorcinol formulation.

Material and methods The composition of the formulation of topical resorcinol 15% tested was: resorcinol 15 g, purified water 15 g, sodium metabisulfite 0.1 g and lanette base cream qs 100 g.

To determine the ability of microorganisms to grow in the formulation, several reference strains, according to the EP (chapters 2.6.12 and 2.6.13) were selected: *Pseudomonas*