2.8:1 to 6.3:1. (This does not include the 27% reduction in drug spend observed during the study period. However, more longitudinal data are required to confirm and characterise this phenomenon.)

- In the third quarter of 2018, 21 medication incidents were reported from the study ward compared with an average of 4 incident reports from the first and second quarters of 2018. This represents a fivefold increase in medication incident reporting, suggestive of an enhanced culture of patient safety.

Conclusion and relevance This study assessed and quantified a wide spectrum of pharmacist contributions to medication management and safety. Costing of these contributions estimated the cost-benefit ratio of the clinical pharmacy service, providing compelling support for the extension of this service throughout the hospital.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest.

4CPS-185 ADMINISTRATION OF ORAL ANTICANCER DRUGS FOR PATIENTS WITH SWALLOWING DIFFICULTIES

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10.1136/ejhp-2020-eahpconf.286

Background and importance Administration of oral anticancer drugs (OAD) can be problematic in patients with swallowing difficulties. The inability to swallow solid dosage forms can compromise compliance and may lead to poor clinical outcome, representing a challenge for pharmacists.

Aim and objectives To identify alternative administration options for OAD in patients with swallowing difficulties.

Material and methods We conducted a systematic review with paired reviewers. All OAD used in our hospital were included. Our search was made in the following databases: Micromedex, Drug Information Handbook of Oncology and Medline. We also searched in every summary of product characteristics (SPC) and consulted with each laboratory when no information was obtained.

Results Sixty-three active substances were included in the systematic review, 40 were formulated as tablets. In 13 drugs there was information in the drug information document about alternative ways of administration. Information on alternatives in administration was found for 46/63 drugs: 15/46 had a galenic formulation (alectinib/busulfan/cyclophosphamide/erlotinib/etoposide/hydroxycarbamide/imatinib/lapatinib/methotrexate/mitotane/pomalidomide/thalidomide/tetrastine/tioguanine/topotecan); 5/46 had commercially available oral preparations (dabrafenib/dasatinib/eltrombopag/temozolomide/trametinib); 1/46 had both galenic and commercial preparations (mercaptopurine); and 25/46 had an alternative method of manipulation (see table 1) following recommendations for manipulation of hazardous drugs (NIOSH, group 1) and providing the necessary material from the pharmacy service.

Any alternative was found in 17/63 due to: lack of information (10/17), pharmacokinetics/physicochemical parameters (4/17) and high risk of manipulation (3/17). Unified OAD recommendations (repeat the process twice to ensure the entire drug).

Conclusion and relevance For most OADs, official information (SPC/laboratory) regarding swallowing difficulties is not

Abstract 4CPS-185 Table 1

Drug	Method proposed	Oral liquid vehicle	Process time (min)
Afatinib			
Capecitabine			
Ceritinib			
Chlorambucil			
Osimertinib			
Procarbazine			
Ruxolitinib		Water	15
Vandetanib			
Venetoclax			
Palbociclib	Disperse	Hot water	5
Vismodegib		Semisolid food	
Lomustine			
Nilotinib		Apple sauce	2
Axitinib			
Everolimus			
Gefitinib			
Ibrutinib		Water	
Melphalan			
Sorafenib*	Dissolve		10–15
Vemurafenib*	(*previously		
Crizotinib	crushed)	Hot water	10 (+15 min cold water)
Lenalidomide			15
Imatinib		Apple juice/water	15
Lenvatinib			10
Sunitinib		Apple sauce	2

available. Therefore, this type of systematic review can be useful for pharmacists to provide an alternative which is equally safe and effective for the patient.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest.

4CPS-186 DESCRIPTION OF PHARMACEUTICAL INTERVENTIONS IN AN INTENSIVE CARE UNIT

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10.1136/ejhp-2020-eahpconf.287

Background and importance Several associations of scientists and clinical pharmacists have developed the specialty of critical care pharmacists, among them the American College of Clinical Pharmacy, the American Society of Health System Pharmacist and the Operating Room Satellite Pharmacy Association. Patient safety and clinical outcomes are enhanced when clinical pharmacists participate proactively as a member of the multidisciplinary intensive care unit (ICU) team.

Aim and objectives To describe the pharmaceutical interventions (PIs) carried out by a resident pharmacist and its acceptance in a tertiary referral hospital.

Material and methods A prospective and descriptive study was carried out in an ICU of 30 beds in a tertiary referral hospital for 2 months, from July to August 2019. Pharmacist interventions, both proactive recommendations and resolution of question by the rest of the care team, were considered. Variables included were number of ICU admissions, number of PIs,

drugs involved according to the anatomical therapeutic chemical (ATC) classification, type of PI and acceptance rate. PIs were classified into seven groups: dosage adjustment, pharmacokinetic monitoring, stopping treatment, switching to equivalent therapeutic drug or pharmaceutical form, information about drug administration, duplicity and other (eg, date and time of administration).

Results A total of 430 patients were admitted to the ICU during the study period. We performed 115 PIs in 66 patients (1 intervention/3 patients admitted): 13.9% were related to dosage adjustment, 24.4% to pharmacokinetic monitoring, 12.2% to stopping treatment, 2.6% to switching to an equivalent therapeutic drug or pharmaceutical form, 16.5% to drug administration information, 18.3% to drug duplicity and 12.2% other. Regarding ATC classification, 42.6% of PIs were related to group J, 13.9% to group B, 12.2% to group H, 6.1% to groups N and C, 4.4% to groups A and R, and 10.5% to group V. The acceptance rate was 94.5%.

Conclusion and relevance The clinical pharmacist integration into the ICU enhanced pharmacotherapy optimisation of critical patients, especially through pharmacokinetic monitoring and interventions related to anti-infective drugs. The acceptance rate was >90%, which indicated a considerable concern by the ICU team.

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No conflict of interest.

4CPS-187 PROGNOSTIC VALUE OF HAEMATOLOGICAL INFLAMMATORY MARKERS IN PATIENTS WITH METASTATIC NON-SMALL CELL LUNG CANCER TREATED WITH PEMBROLIZUMAB

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10.1136/ehjpharm-2020-eahpconf.288

Background and importance Proinflammatory status has been associated with worse outcomes in patients treated with immunotherapy.

Aim and objectives To evaluate the prognosis role of haematological inflammatory markers in patients with metastatic non-small cell lung cancer (mNSCLC) treated with pembrolizumab.

Material and methods This was an ambispective study that included mNSCLC patients with PD-L1 expression level $\geq 50\%$ treated with firstline pembrolizumab between January 2017 and June 2019. Data collected included age, gender, PD-L1 expression level, baseline Eastern Cooperative Oncology Group (ECOG) performance status (PS), baseline absolute neutrophil count (ANC), lymphocytes, leucocytes, monocytes and platelets. Neutrophil to lymphocyte ratio (NLR; ANC/lymphocyte count), lymphocyte to monocyte ratio (LMR; lymphocyte count/monocyte count) and platelet to lymphocyte ratio (PLR; platelet count/lymphocyte count) were calculated. $NLR \geq 5$, $LMR < 1.7$ and $PLR > 144\ 000$ were considered as cut-off values. We analysed response rate, progression free survival (PFS) and overall survival (OS). The Kaplan–Meier method was used to estimate PFS and OS and multivariate Cox proportional hazard modelling.

Results Forty-two patients were included (71.4% men, $n=30$) and mean age was 67 years (± 8.2). PD-L1 expression levels were $\geq 90\%$ in 31% of patients ($n=13$). Most patients had an ECOG PS of 0–1 ($n=30$). Partial response, stable disease and disease progression were recorded in 31% ($n=13$), 28.6% ($n=12$) and 19% ($n=8$), respectively. The remaining 21.4% died before response evaluation. Median PFS and OS were 5.4 months (95% CI 0–11.1) and 10.3 months (95% CI 8.9–11.7), respectively. In the multivariate analysis, $NLR \leq 5$ was identified as an independent predictor of PFS (hazard ratio (HR)=0.73; 95% CI 0.14–0.97) and OS (HR=0.16; 95% CI 0.052–0.52). ECOG performance status score of 0–1 was also significantly correlated with a higher SLP (HR=0.24; 95% CI 0.082–0.73) and SG (HR=0.20; 95% CI 0.058–0.72). $PLR \leq 144$ was only an independent predictor of PFS (HR=0.21; 95% CI 0.065–0.67).

Conclusion and relevance Baseline NLR and ECOG were correlated with PFS and OS in patients with mNSCLC treated with pembrolizumab as firstline therapy. $PLR > 144$ was also an independent predictor of PFS, but not OS. NLR might be a cost effective prognostic biomarker for firstline pembrolizumab treatment in mNSCLC patients.

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No conflict of interest.

4CPS-188 PHARMACEUTICAL INTERVENTION TO REDUCE THE ANTICHOLINERGIC BURDEN IN OLDER HOSPITALISED PATIENTS

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10.1136/ehjpharm-2020-eahpconf.289

Background and importance Anticholinergic burden has been associated with cognitive and functional impairment, risk of falls, hospitalisations and morbidity/mortality, especially in older patients.

Aim and objectives To study the anticholinergic burden in older patients in a hospital setting and to reduce the use of drugs with anticholinergic effects (DACE) in those patients with a high anticholinergic risk (HAR).

Material and methods A cross sectional study was conducted in patients aged ≥ 65 years of age, admitted to the internal medicine department. The study was scheduled once a week for 4 weeks between August and September 2019. Patients with palliative care and readmissions were excluded. Gender, age, length of hospital stay and the number of drugs prescribed were registered. The anatomical, therapeutic and chemical (ATC) classification was used to classify drugs. Anticholinergic burden was calculated using the drug burden index (DBI) calculator (available at: <http://anticholinergicscales.es/patients>). Ophthalmic drugs and medication ‘as needed’ were not assessed. The medication plan of patients with HAR was reviewed together with their physicians in order to reduce the anticholinergic burden through reducing the dose, stopping treatment or changing the DACE.

Results Eighty-two patients (70% women, 85 ± 8 years old) were included. Median length of hospital stay and number of