

Session: EV023 Pharmacoepidemiology, improved prescribing and antibiotic stewardship

**Category: 5d. Pharmacoepidemiology, improved prescribing and antibiotic stewardship**

22 April 2017, 08:45 - 15:30  
EV0423

## Drug-drug interactions (DDIs) between ciprofloxacin and nitrofurantoin and other medications in Slovenian nursing homes: a point-prevalence nation-wide study

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**Background:** DDI may represent an important cause of morbidity. DDIs are common in elderly patients who receive multiple drug treatment. Antibiotic treatment may increase the likelihood of DDIs. The prevalences of potential DDIs between ciprofloxacin (CIP), and nitrofurantoin (NIT) in nursing home residents were investigated in a point-prevalence study.

**Material/methods:** A point-prevalence study was performed from April 2016 to June 2016 in all Slovenian nursing homes. DDIs were determined by different interaction classes with Lexicomp Online™ 19.0 version and only X (major interactions and should be avoided) and D (minor interactions and avoid if it is possible) were included. Only X DDIs were highlighted in detail. DDIs among all types of medications in each patient were included. PRISCUS list was used to determinate potentially inappropriate antibiotics. An odds ratio (OR) with 95% CI was used to calculate odds between different groups.

**Results:** 68.4% of Slovenian nursing homes with 13,022 inhabitants responded to the invitation to the study. On study day, 317 (2.4%) inhabitants were receiving antibiotics. Complete sets of data were available for 233 patients (age=83.5, SD=9.8). The average number of medication per patient on

antibiotic was 10.9 (SD=3.9). Thirty-nine (16.7%) patients were treated with CIP and 7 patients (3.0%) with NIT. At least one potential X interaction was found in 72 (30.9%) and at least one potential D interaction was found in 172 (73.8%) patients. At least one X DDIs between antibiotics and other drugs was found in 27 patients (11.5%) (17/39 patients CIP, 6/8 moxifloxacin, 3/5 azithromycin and 1/4 levofloxacin and 0 NIT). Quetiapine and CIP was most frequent X DDIs which occurred in 12 patients treated with CIP (12/17), followed by CIP-escitalopram and CIP-duloxetine in 2 cases. Other drugs with potential X DDIs with CIP were amiodarone, domperidone, ivabradine, and sotalol. Most of the X DDIs were pharmacodynamic (QTc prolongation) followed by pharmacokinetic DDIs. According to PRISCUS list, nitrofurantoin was the only antibiotic which may be potentially inappropriate. OR for at least one X DDIs in patient treated with CIP was 1.95, 95% CI 0.95-3.95 and 0.36, 95% CI 0.43-3.01 for NIT.

**Conclusions:** Potential X and D DDIs are common in nursing-home residents. The risk for a DDI is increased in patients treated with CIP, and the DDIs between psychopharmaceuticals and CIP are the most problematic. NIT, which is included in the PRISCUS list of potentially inappropriate antibiotics in elderly appeared to be a safe drug in terms of DDIs. According to our results, a pharmacotherapy review done by clinical pharmacist and education from this topic would be a highly recommended to avoid important DDIs in elderly patients treated with CIP.