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Pharmacology applied to geriatric medicine

Co-prescriptions of psychotropic drugs to older patients in a general hospital

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ABSTRACT

Introduction: The prescription of psychotropic drugs to older patients in a hospital setting has not been extensively characterized. The objective was to describe the inappropriate co-prescriptions of psychotropic drugs in hospitalized patients aged 75 and over.

Methods: By analysing the medical database from 222-bed general hospital in France, we reviewed a total of 11,929 stays of at least 3 days by patients aged 75 and over. Prescriptions and co-prescriptions of psychotropic drugs were identified automatically. Anticholinergic drugs with sedative effects were considered as psychotropic drugs. An expert review was performed for stays with the co-prescription of three or more psychotropic drugs to identify inappropriate co-prescriptions.

Results: Administration of a psychotropic drug was identified in 5475 stays (45.9% of the total number of stays), of which 1526 (12.8% of the total) featured at least one co-prescription. Co-prescriptions of three or more psychotropic drugs for at least 3 days were identified in 374 stays (3.1% of the total). Most of these co-prescriptions ($n = 334$; 89.2%) were considered inappropriate because of the combination of at least two drugs from the same psychotropic class ($n = 269$), the absence of a clear indication for a psychotropic drug ($n = 173$) and a history of falls ($n = 86$). However, the co-prescriptions were maintained after hospital discharge in 77.4% of cases.

Conclusion: The co-prescriptions of psychotropic drugs should be re-evaluated in older hospitalized patients.

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1. Introduction

Many prescriptions of psychotropic drugs to older patients are potentially inappropriate [1–3]. The use of psychotropic drugs (and benzodiazepines in particular) in older patients is linked to a greater risk of falls and a possible increase in the risk of bone fractures [4–7]. Furthermore, the use of anxiolytic and hypnotic drugs can lead to dependence with a risk of withdrawal syndrome, memory disorders and a possible increase in the development of dementia [8]. Antipsychotic drugs are also responsible for tardive dyskinesia [9] and a lengthened QT interval associated with an elevated risk of sudden death [10]. Lastly, some anticholinergic

drugs are associated with a number of additional harmful adverse events in older people: constipation, urinary retention, confusion, and memory disorders [2].

Despite this risk of serious adverse events, psychotropic drugs are often prescribed to older people. In the United States, it has been estimated that psychotropic drugs are prescribed to 54% of older people in long-stay care homes and 19% of non-institutionalized older people [11,12]. In Europe, between 32% and 53% of people aged 75 years and over are thought to be taking at least one psychotropic drug [13–15]. Likewise, between 14% and 50% of the over-75s in France take psychotropic drugs (often for periods of several months or years) [16,17]. A number of studies have suggested that the consumption of psychotropic drugs by older people is on the increase [18,19].

Exposure to psychotropic drugs has been mainly evaluated in primary care and in emergency departments [20], which thus reflect practice in ambulatory patients. In contrast, the prescription

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of psychotropic drugs in a hospital setting has not been studied extensively. Hospital prescriptions merit further investigation because they influence the general practitioner's prescribing patterns once the patient has been discharged [21,22].

The primary objective of the present study was to describe the prescription of psychotropic drugs and combinations of psychotropic drugs in hospitalized patients aged 75 and over.

2. Materials and methods

2.1. The study database

We performed a retrospective, observational, single-centre cohort study in a 222-bed general hospital (with surgery, pulmonology, cardiology, angiology, hepatogastroenterology, internal medicine and accident and emergency departments) in a general hospital in northern France. Data were extracted from January 2009 to December 2013. Records were available for a total of 72,228 hospital stays and were then anonymized. The study was approved by the French National Data Protection Commission (*Commission nationale de l'informatique et des libertés*; reference number: 1487204) and the local independent ethics committee in January 2008.

The following data were encoded in the database: demographic and administrative data; diagnostic data, according to the International Classification of Diseases; 10th Revision (ICD-10) [23]; diagnostic and therapeutic procedures, according to the French *Classification commune des actes médicaux* (CCAM) classification; medication data, according to the Anatomical Therapeutic Chemical (ATC) Classification [24]; laboratory results, according to the Committee on Nomenclature, Properties and Units classification (IUPAC) [25]. The text of discharge letters and hospital care reports were anonymized (using the "Fast And Simple De-Identification Method") and encoded as text files [26]. The database also listed all medications administered to the patient by medical staff during the stay.

2.2. Detection of combinations of psychotropic drugs and/or anticholinergic sedatives

In this study, we mainly focused on hypno-sedatives, anti-psychotics and antidepressants drugs. We included patients who used drugs with system codes N05A (antipsychotics), N05B (anxiolytics), N05C (hypnotics and sedatives), N06A (antidepressants), N06C (psycholeptics and psychoanaleptics in combination). Benzodiazepine derivatives under investigation in this study were from different ATC codes: N03A (i.e. antiepileptics), N05B (i.e. anxiolytics), and N05C (i.e. hypnotics and sedatives). Additionally, we included subgroups of ATC code N01A, N03A, N04B, N07X because the corresponding drugs have significant sedative effects and were identified in the Laroche list [27]. We also included subgroups of ATC code R06A, which corresponds to antihistamine drugs for systemic use with known sedative effects [27,28]. The ATC codes used to detect psychotropic drugs are given in supplementary data (Table S1). Benzodiazepine derivatives under investigation in this study were from different ATC codes: N03A (i.e. antiepileptics), N05B (i.e. anxiolytics), and N05C (i.e. hypnotics and sedatives).

Only stays of at least 3 days by patients aged 75 and over were eligible for the study. We automatically identified all stays with at least one administration of a psychotropic drug, in the following categories:

- the prescription of a single psychotropic drug;
- a co-prescription of two psychotropic drugs;
- the co-prescription of three or more psychotropic drugs [27].

The place (i.e. hospital, community setting, or nursing home) where the prescriptions of psychotropic drugs were initiated was not available.

2.3. Detection of major and prolonged psychotropic drugs co-prescriptions

A physician reviewed all stays with at least one co-prescription of three or more psychotropic drugs. The review was performed with ADE-Scorecards[®] software [29]. The latter tool was developed as part of the European "Patient Safety through Intelligent Procedures" project (grant number: 216130) [30]. It enables the physician to review cases via an interface that summarizes the available data for each stay (administrative data, lab results, diagnostic data, drug prescriptions and discharge letters). Exposure to combinations of psychotropic drugs was considered to be significant if the drugs in question had been administered for at least three consecutive days. Exposures for less than three days were considered to be corrected errors or short-duration prescriptions in response to an isolated event.

2.4. Data extraction on major and prolonged psychotropic drugs co-prescriptions

A physician reviewed each stay with a confirmed, prolonged co-prescription of several psychotropic drugs with ADE-Scorecards[®] software. The following items of information on the psychotropic drugs were collected: the greatest number of psychotropic drugs administered simultaneously during the hospital stay; the psychotropic drug classes administered; and duplications of psychotropic drug classes. Information on the patient's potential history of neuropsychiatry disorders, i.e. the conditions that may have prompted the prescription of psychotropic drugs was extracted: dementia (in the presence or absence of a behavioural disorder), depressive syndrome, bipolar disorder, psychosis, behavioural disorders, anxiety disorders, sleep disorders, and a previous history of falls. In order to determine whether the psychotropic drug treatments were continued at home after discharge, the psychotropic drugs recorded as being administered at the time of discharge were noted according to the discharge letter. Stays for which the treatment at discharge was not specified were excluded from this sub-analysis.

2.5. Statistical analysis

All statistical analyses were performed using R software [31]. Our descriptive analysis of the study population covered the following parameters: age, gender, the Charlson Comorbidity Index calculated using ICD-10 codes, as recommended by Quan et al. [32], and the number of drugs administered to each patient (calculated solely for the day before discharge). Quantitative variables were quoted as the mean \pm standard deviation (SD). Qualitative variables were quoted as the number (frequency).

3. Results

3.1. Characteristics of the older hospitalized patients

We identified 11,929 hospital stays of at least 3 days by patients aged 75 and over (i.e. 16.5% of the total number of hospital stays for the study period). The patients were predominantly female (66.1%) and the mean age was 84.3 (SD = 5.3). Most patients were taking several drugs: the mean number of drugs administered on the day before discharge was 5.2. The mean Charlson Comorbidity Index was 1.54 (SD = 2.6). The mean duration of the stays was 10.8 days (SD = 7.4).

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