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Research paper

A patient-centered prescription model assessing the appropriateness of chronic drug therapy in older patients at the end of life

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ABSTRACT

Introduction: Older patients with multimorbidity usually present with progressively worse impairment, resulting in a limited life prognosis. Consequently, drug therapy, which was previously appropriate can become inappropriate and be associated with negative health outcomes. The main objective is to identify inappropriate prescriptions in older patients and to optimize them according to patient directed care goals, established through the application of the patient-centered prescription model, which is based on a shared decision-making process including the patient, physicians and a clinical pharmacist.
Methods: This was a prospective observational study of patients admitted to an Acute Care Elderly Unit. Comprehensive Geriatric Assessment was applied to each patient in order to identify advanced frailty as an indicator of an end of life situation. In order to identify inappropriate prescriptions, each patient's pharmacotherapeutic plan was assessed by applying the Patient-Centered Prescription Model, a three-step process: (i) patient centered assessment, where care goals were established, setting the stage for the second and third steps; (ii) diagnosis-centered assessment; (iii) medication-centered assessment.
Results: Three hundred and nine patients (mean age 86.7 years) were included. Inappropriate prescribing occurred in 39.8% of patients, more frequently amongst end-of-life patients (47.2%) ($P < 0.05$). During admission, 93.4% of patients with inappropriate prescriptions received an optimized therapeutic plan.
Conclusions: A high prevalence of inappropriate prescriptions among patients with multimorbidity was detected, especially in patients at end of life. The patient-centered prescription model helps to identify frail patients on potentially inappropriate prescriptions by means of a holistic review of each patient's situation, in a shared decision-making process.

1. Introduction

Drug therapy in older patients is becoming a worldwide concern due to the progressive increase in the number of drug prescriptions [1] and the difficulties in ensuring appropriate prescribing [1]. Many older people suffer from multimorbidity and, following guidelines for the management of individual conditions, are prescribed multiple medications [2]. Appropriate prescribing in these patients is a complex problem that cannot be solved by simply applying clinical practice guidelines (CPG) [3], especially in those patients, which are approaching the end of their life, because they are likely to have different prescription needs, and risk versus benefit discussions should differ from healthy adults with long life spans.

To create an individualized drug therapy plan and ensure appropriate prescribing in accordance with the vulnerability of each patient's phase of life, it is essential to incorporate frailty measures into the care plan. Frailty, understood as a clinically recognizable state of decreased reserve and resistance to stressors resulting from cumulative declines of multiple physiologic systems, increases vulnerability to adverse outcomes [4].

Given that frailty is the most frequent condition among older patients [5], knowing the degree of frailty is essential to designing therapeutic objectives and tailoring individualized prescriptions [3]. Patients with multimorbidity usually show an evolution

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towards a progressive clinical, functional or cognitive impairment, which, in most cases, results in a limited life prognosis. In this scenario, drug therapy, which could have been appropriate in the past, can eventually become inappropriate as a disease progresses.

Inappropriate prescribing (IP), a situation where pharmacotherapy does not meet the established medical standards, is associated with negative health outcomes such as adverse drug reactions, hospitalization, redundant healthcare utilization and untimely death [6]. Frail older patients are more sensitive to IP, as they suffer a reduction in their ability to tolerate medications due to changes in pharmacokinetics and pharmacodynamics [2].

In recent years, different tools have been developed to identify potentially inappropriate medications in older patients. They can be grouped into implicit (judgment-based) and explicit (criterion-based) tools such as Beers or STOPP-START criteria [7]. These criterion-based tools, derived from expert reports or published reviews, have high reliability and reproducibility. They are generally used as rigid standards without addressing individual differences among patients. In contrast, implicit criteria rely on evaluator judgment and consequently they may have low reliability and low practical utility [8].

As a recent review concludes, for appropriate prescribing in frail populations, the development of a specific tool to assess the appropriateness of therapy that accounts for patient factors such as quality of life, functional status, goal of care, and remaining life expectancy is absolutely necessary [9].

In this context, we have proposed a framework that combines both the clinical judgment and the scientific evidence in a pragmatic and systematic approach.

The main objective of this study was to identify potential IP in a group of older patients and to optimize prescription according to their care goals, which are established through the application of the patient-centered prescription model, based on a shared decision-making process including patient, physicians and a clinical pharmacist.

Secondary objectives were:

- assessing whether the most vulnerable patients, approaching the end of life (EOL), have a higher IP prevalence;
- assessing adverse drug events (ADE) prevalence at admission.

2. Material and methods

2.1. Design

This was a descriptive observational study of patients admitted to the Acute Care Elderly (ACE) Unit, a medical-surgical unit of a secondary care hospital over a six-month period from September 2013 to February 2014. Criteria for admission to the ACE Unit were age 85 or older and/or the presence of cognitive impairment. All patients admitted during the study time frame were included in the study.

2.2. Sample size

Sample size for this study (57 EOL patients) was calculated with GRANMO statistical computer programme (version 7.12 April 2012).

2.3. Analyzed variables

Variables collected for the analysis included age, sex, admitting diagnosis, medication information and end-of-life (EOL) status (characterized by accumulating health problems over a period of weeks to months with failing homeostasis that is irreversible and inexorably leading to death [10]).

Patients were already identified as EOL at admission to the ACE unit. NECPAL CCOMS-ICO©, a screening tool designed to help to identify patients at EOL with palliative care needs [11], systematically applied to the patients by the general practitioner, as established by the Catalan Health Care System. Once the patients were admitted, Comprehensive Geriatric Assessment (CGA) was applied by a geriatrician in order to identify advanced frailty as an indicator of EOL situation [12,13] and to contrast the pre-existing identification of EOL with NECPAL.

Medication information included:

- number of medications prior to admission (further categorized as polypharmacy – five or more drugs per day [1]);
- inappropriate medications;
- the presence of ADE;
- if the drug therapy regimen was modified during the admission.

Prescription is inappropriate when the likelihood of an ADE outweighs therapeutic benefit, especially when there is evidence of safer or more efficient therapeutic options; when drugs are used more frequently or longer than needed; when there is a high risk of drug-drug or drug-disease interactions and therapeutic duplications; or, finally, when an indicated medication is not prescribed [2,14].

ADE is any adverse symptom detected, which is either preventable or not through the use or not of a drug [15]. ADEs were identified by a geriatrician and validated with the clinical pharmacist.

2.4. Ethical approval

The study was based on the collection of data generated from clinical practice. Thus, informed consent was not considered necessary because inclusion in this study did not constitute a specific intervention. The Ethics Committee for Clinical Research of the Hospital Consortium of Vic approved this study.

2.5. Intervention

Each patient's pharmacotherapeutic plan was assessed through application of the patient-centered prescription model [16]. In

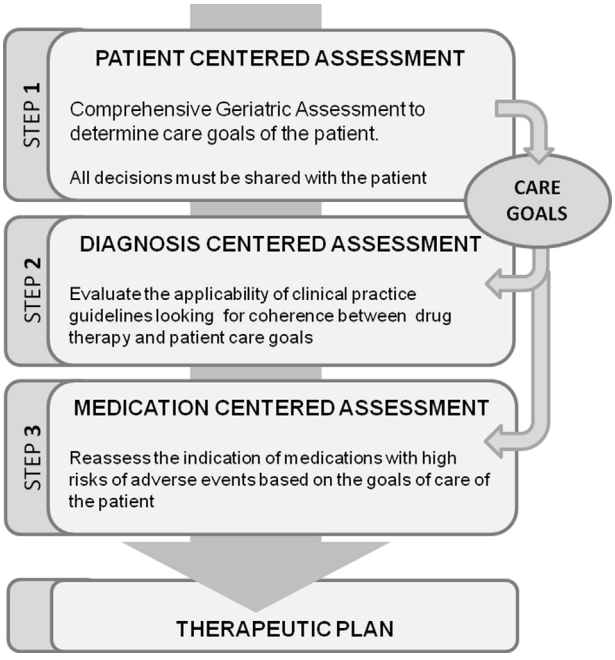

Fig. 1. Patient-centered prescription model.