Clinical Research

Antiseizure, antidepressant, and antipsychotic medication prescribing in elderly nursing home residents ☆

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A B S T R A C T

Objective: The incidence of epilepsy is highest in the elderly and the prevalence of epilepsy is higher in nursing home residents than in other cohorts. Co-medications that act in the central nervous system (CNS) are frequently prescribed in this population. The objective was to identify the most commonly prescribed antiseizure drugs (ASDs) and determine the frequency of use of antipsychotic and antidepressant medications in elderly nursing home residents receiving ASDs.
Methods: Data were obtained from a pharmacy database serving 18,752 patients in Minnesota and Wisconsin nursing homes. Prescribing information was available on ASD, antidepressant, and antipsychotic drugs on one day in October 2013. The frequency distribution by age, formulation, trademarked/generic drugs, route of administration, and multiple drug combinations were determined.
Results: Overall, 66.8% of 18,752 residents received at least one CNS-active drug as classified by the Generic Product Identifier classification system. For those 65 years and older, ASDs were prescribed for 14.3% residents. Gabapentin comprised 7.3%; valproate 3.0%; levetiracetam 1.8%; and phenytoin 0.9%. An antidepressant was used in 64.2% of persons prescribed an ASD. Antidepressant use varied for specific ASDs and ranged from 50 to 75%. An antipsychotic medication was used in 30% of persons prescribed an ASD and ranged from 16.8 to 54.2% for specific ASDs. Both antidepressant and antipsychotic use occurred in 22.2% of persons prescribed an ASD, respectively.
Significance: The pattern of CNS-active drug use has changed from previous years in this geographic region. Use of phenytoin has declined markedly, but antidepressant use has increased substantially. The CNS side effect profile of these medications and the possible long-term consequences in this population can greatly complicate their therapy.

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1. Introduction

The prevalence of epilepsy exhibits a U-shaped curve, with high rates in children and even higher rates in the elderly [1]. The number of elderly patients in the United States is rapidly increasing and is projected to be 71 million by 2030 [2]. The prevalence of epilepsy is higher in elderly nursing home residents than in any other cohort, with the point prevalence of an ICD-9 epilepsy/seizure code present in 7.8% of all elderly home nursing residents in the USA during 2007 [3].

Information regarding the patterns of antiseizure drug (ASD) use in this population is limited, and most of the available data are from studies reported more than a decade ago. The earliest report from a large nursing home population was by Schachter et al. in 1998, which reported phenytoin to be the most commonly used ASD [4]. Other studies also indicated phenytoin to be the most commonly prescribed ASD in this setting [5–7].

The use of ASDs parallels the prevalence of epilepsy, and use of CNS co-medications such as antidepressants and antipsychotics is also high [5]. All three classes of drugs affect brain function and have the potential for pharmacodynamic as well as pharmacokinetic interactions. Recent information regarding the patterns of use of ASD and other CNS-active drugs in nursing homes is not readily available. This report presents information regarding use of CNS drugs at one time point during 2013 in a region previously reported and discusses how patterns of prescribing have changed.

2. Methods

2.1. Subjects

The data for this study were obtained from a pharmacy database serving Minnesota and Wisconsin nursing home residents and included information on residents who were receiving at least one ASD, antipsychotic, or antidepressant medication. Each drug was classified into one of the three groups (ASD, antipsychotic, or antidepressant) based on the Generic Product Identifier (GPI) classification system. The data extracted included age, formulation type, trademarked/generic drugs, and route of administration. Data were a cross section on a single day in October 2013. Diagnostic codes associated with drug use were not available.

2.2. Data analysis

Evidence shows that incidence and prevalence rates of epilepsy increase with age (across the entire age span) in the community-dwelling population [1,8]. It may not be appropriate to equate "elderly" who are 65 years of age with those who are 85 years of age in terms of functional or cognitive abilities. In addition, elderly with 85 years of age are more likely to develop chronic illness, be disabled, and be more dependent on others for assistance with daily activities [9]. Therefore, elderly patients were divided into one (≥65 years) and four age groups: 65–74, 75–84, 85–94, and 95+ years. Descriptive statistics were performed (RStudio, Inc.) to determine the distribution of drugs prescribed by age, formulation type, trademarked/generic drugs, and route of administration. The percentage of residents taking a particular drug was calculated as the ratio of number of residents receiving the particular drug to the total number of residents receiving all the drugs in the particular drug type. The number and percentage of residents receiving ASDs in combination with antipsychotic and antidepressant medications (ASD + antidepressants, or ASD + antipsychotics, or ASD + antipsychotics + antidepressants) were also evaluated.

3. Results

3.1. Subject characteristics

The total number of nursing home residents on the study day was 18,752. The median age of all residents in this study was 75 years. Among the elderly nursing home residents, a majority of the residents receiving a CNS medication were women (70.7%) and were in the age group 85–94 (26.7%) (Table 1).

3.2. Medication use

Overall, 66.8% of the total population (N = 18,752) was prescribed a CNS-active drug. For those 65 years and older, 14.3% of the total population was prescribed an ASD, 14.7% an antipsychotic, and 32.6% an antidepressant medication (Fig. 1). Gabapentin prescriptions comprised 7.3%, valproate 3.0%, levetiracetam 1.8%, phenytoin 0.9%, and pregabalin 0.5% (data not shown).

Within the ASD group, the five most commonly prescribed ASDs were gabapentin (50.6% of the total ASDs), valproate (20.7%), levetiracetam (12.2%), clonazepam (10.5%), and phenytoin (6.4%) (Table 2). Approximately 60% of the residents in the 95+ age group were prescribed gabapentin, whereas 41% of the residents were prescribed gabapentin in the youngest cohort. In contrast, valproate, levetiracetam, and clonazepam were more frequently prescribed in the youngest compared to the oldest cohort. In the antidepressant medication group, the five most commonly prescribed medications were trazodone (28.4%), citalopram (28.1%), mirtazapine (19.0%), sertraline (16.9%), and paroxetine (7.%) (Table 2). Citalopram and mirtazapine use was higher in the older age groups than the youngest age groups, whereas venlafaxine use was

Table 1
Characteristics of study subjects.

Residents, n (%)			
	Overall	ASDs	Antidepressants	Antipsychotics
Age group				
<65	4704 (37.5%)	2075 (43.6%)	3320 (35.2%)	2700 (49.4%)
≥65	7829 (62.5%)	2687 (56.4%)	6106 (64.8%)	2762 (50.6%)
Elderly age group				
65–74	1411 (11.3%)	700 (14.7%)	1059 (11.2%)	615 (11.3%)
75–84	2446 (19.5%)	921 (19.3%)	1934 (20.5%)	891 (16.3%)
85–94	3348 (26.7%)	928 (19.5%)	2648 (28.1%)	1043 (19.1%)
95+	624 (5%)	138 (2.9%)	465 (4.9%)	213 (3.9%)
Gender				
Men	2295 (29.3%)	826 (30.7%)	1716 (28.1%)	841 (30.4%)
Women	5534 (70.7%)	1861 (69.3%)	4390 (71.9%)	1921 (69.6%)

lower in older age groups than the youngest age group. In the antipsychotic medication group, the five most commonly prescribed medications were quetiapine (36.5%), risperidone (19.2%), prochlorperazine (18.6%), haloperidol (14.6%), and olanzapine (13.6%) (Table 2). Prochlorperazine and haloperidol use was higher in the older age groups than in the youngest age group, but olanzapine was lower in the older age groups than the youngest age group.

3.3. Distribution based on combinations of ASDs, antidepressants, and antipsychotics

In the 18,752 nursing home residents, the percentage prescribed a combination of drugs was 9.2% for ASDs and antidepressants, 4.4% for ASDs and antipsychotics, and 9.5% for antipsychotics and antidepressants (Fig. 1). Overall, 3.2% of the residents were prescribed drugs of all three classes.

Among the eight most commonly prescribed ASDs, the use of an antidepressant with an ASD ranged from 50% (with carbamazepine) to 75% (with clonazepam) (Fig. 2). The use of antipsychotic medications with an ASD ranged from 16.8% (pregabalin) to 54.2% (valproate). The use of all three medication groups ranged from 12% to 39% for the various ASDs.
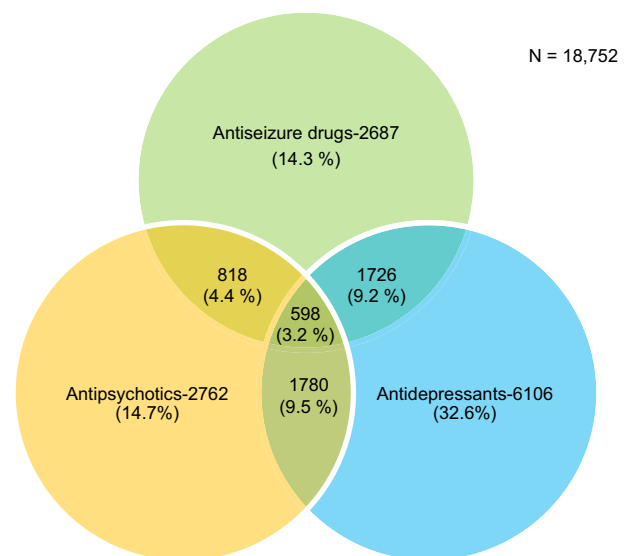

Fig. 1. Number and percentage of residents receiving the drugs in each group or combination. Legend: Percentages were calculated by dividing the number of residents in each group or combination by the total number of residents in the nursing home (denominator; N = 18,752).