CORRELATION BETWEEN FRACTURES IN THE ELDERLY RESULTING FROM FALLS AND PREVIOUS DRUG USE

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SUMMARY

The use of medication by elderly individuals is frequently and is constantly growing due to the increase of life expectance rates in Brazil. When some of these drugs are administered, they can cause collateral effects like dizziness and decreased reflex, potentially causing the occurrence of falls resulting in fractures. This study examined whether the use of medications by the elderly could be regarded as a risk factor to fractures resulting from falls. The study, conducted in 2004, assessed 205 hospitalized patients ≥ 60 years old, with fractures resulting from falls. These patients were statistically compared to a control group (205 patients) in the same age group and without fractures. We've found that the use of medication can be regarded as a risk factor to fractures resulting from falls. Our results could be useful to raise the awareness of doctors, patients and their families so that to avoid accidents when any drug therapy is required.

Keywords: *Pharmaceutical preparations; Fractures bone; Aged.*

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INTRODUCTION

Population aging in Brazil has been increasing the prevalence of neurodegenerative and psychiatric diseases [1,2], as well as cardiovascular and metabolic illnesses. With the increasing number of patients using chronic drugs, sometimes it is not possible to provide them a strict medical follow-up to assess adverse and side effects.

The number of elderly patients depending on some kind of drug for chronic diseases and/ or for improving their overall quality of life is growing day by day. We can notice, in emergency rooms, that a large portion of patients above the age of 60 and who had suffered any kind of fracture regularly take chronic drugs.

Among the factors that have been accounted for the increased risk of falls and fractures among the elderly population are: the use of medicines causing somnolence, changing balance, muscle tonus and/or hypotension[3]. As an example, we must mention the anti-hypertensive agents that can cause postural hypotension or even dizziness; this associated to the use of diuretic agents, requiring the patient to wake up at nigh and walk to the bathroom to urinate, thus facilitating the occurrence of falls and resultant fractures.

In addition to produce a major loss of autonomy and quality of life among the elderly, falls can also affect caregivers, especially family members, who must arrange for special care, or adjust their entire routine towards recovery or adaptation following a fall[4], not to mention the costs for the Public Health System, especially with hospitalizations to treat this kind of accident.

Coutinho and Silva[4], in their study, presented data about the role of drugs on the risk of fractures resulting from falls, requiring hospitalization among the overall elderly population, reaching to alarming results of major interest for the overall medical community. Orthopaedic doctors are responsible for treating fractures, and play an important role in the identification of their probable causes in order to guide multidisciplinary teams towards taking prophylactic measures in order to avoid these accidents.

The prevalence of certain kinds of fractures in the elderly population is known, with injuries of the radius distal end, vertebral bodies of the torso-lumbar interface, humeral and femoral proximal third being frequent[5]. Among these, we highlight the ones of the proximal femur due to the severity of the injury, risk of complications, including death and social costs.

OBJECTIVES

To check if the use of drugs by patients above the age of 60 may be regarded as a risk factor for fractures resulting from falls. To outline an epidemiological profile in this case series.

CASE SERIES AND METHODS

This case series was composed by 205 patients hospitalized at the Orthopaedics and Traumatology Service, who suffered fractures resulting from falls, with age above 60 years, who used drugs in the 24 hours preceding the accident or not. The

Study conducted at the Orthopaedics and Traumatology Service, Medical College of Catanduva (FAMECA) – SP.

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control group was constituted of 205 age-matched subjects presenting no fractures either using drugs or not.
A case-control study was conducted during the period of January – December, 2004. For this purpose, a form was employed as a tool for storage and collection of the study variables. Subsequently, these data were stored on Epi Info 3.3.2 software, which served as a database for statistical measurement and analysis (considering a p value below 0.05 as significant).

RESULTS

Of the 205 cases of fractures resulting from falls among elderly subjects, 71.7% were females and the mean age was 75.1 years, ranging from 60 to 97. The percentage of subjects using some kind of drug in the 24 hours preceding trauma was 72.5%, evidencing the importance of this study.
In the control group, male gender was prevalent, with 62%, and the mean age was 70.5 years, ranging from 60 to 99. The percentage of subjects chronically using drugs was 60.3% (Table 1).
In the statistical analysis, we found an odds ratio (OR) of 57.46%, with confidence interval (CI) of 37.90% - 87.12%. OR represented the probability of a patient using drugs to present fractures and CI representing the interval where the percentage of the OR population is included.
We also found a relative risk (RR), understood as the risk of a patient using drugs to present fracture, of 83.11%, with CI between 72.27% and 95.57%, where CI is the population risk in which the RR will be included (Table 2).

Use of drugs	Group with Fracture		Control Group	
Yes	72,5%	148	60,3%	123
No	27,5%	57	39,7%	82
Total	100%	205	100%	205

Source: research files. P = 0.011

Table 1- *Use of drugs in the group with fractures and control group*

Drugs*	Fracture	Control
AAS	**13**	**17**
Amiodarone	**19**	**8**
Atenolol	**9**	**20**
Captopril	**51**	**30**
Cinarizine	**9**	**1**
Clonazepam	**13**	**1**
Chlorpropamide	**8**	**1**
Diazepam	7	2
Digoxine	6	3
Enalapril	**5**	**13**
Phenobarbital	5	1
Flunarizine	**3**	**1**
Fluoxetine	4	1
Glibenchlamide	9	6
Hydrochlorothiazide	**28**	**14**
Methyldopa	**17**	**7**
Nifedipine	8	3

Source: research files.
* More than 70 different drugs were mentioned.

Table 2 -*Most commonly used drugs*

The following data refer only to the group of subjects with fractures.
In a domestic environment, 74.6% of falls occurred, more frequently occurring at the following specific sites: backyard (19%), bathroom (18.5%), living room (12.2%), bedroom (7.8%) and kitchen (7.8%).
The period of the day accounting for the highest number of accidents was the afternoon (46.3%), followed by morning (39%) and night (14,6%) (Tables 3 and 4).

Drug	Period			Total
	Morning	Night	Afternoon	
Yes	55	20	73	148
No	25	10	22	57
Total	80	30	95	205

Source: research files. P = 0.37

Table 3 - *Drugs use and period of the day when accidents happened*

Fracture site*	Percentage
Femoral proximal third	53,1%
Wrist	26,3%
Shoulder	4,8%
Patella	4,3%
Ankle	4,3%

Source: research files.
** Some elderly individuals presented multiple fractures.*

Table 4- *Fracture site*

DISCUSSION

There are few papers in literature addressing the role of drugs as a risk factor for fractures resulting from falls in the elderly, despite of a significant correlation showed by existent studies.
Regarding the use of drugs and the period of the day when the accident happened, we find no significance (p = 0.37); however, the fact that they occurred mostly during the afternoon may serve as a warning sign for patients, and, especially, to family members.
The site of the fracture in the body follows the patterns described in literature [5], being usually more common at femoral proximal end followed by radius distal third.
The incidence of fractures in the elderly is correlated to the increased bone weakness resulting from osteoporosis and to a higher likelihood towards falls usually presented by those individuals. Those falls, usually occurring at home, have several associated and predisposing factors, the most frequent ones being various neurological disorders, use of drugs acting on psychic conditions and affecting balance, higher muscular deficit and the presence of a number of arthropathies and deficiencies resultant form different diseases that may be present [5]. We find similar results regarding site, domestic environment, where falls occurred and drugs used; nevertheless, we didn't study bone mineral density and whether associated diseases were present or not, thus being nor suggested to be studied in future papers.
The "n" for captopril, clonazepam, hydrochlorothiazide, cinarizine and flunarizine was shown to be quite higher in the group with fractures than in control group. Because these drugs can cause postural hypotension, somnolence, dizziness, need to urinate more frequently, among other effects, they can also increase the likelihood of falls and, consequently, fractures. Among these drugs, we must highli-

ght clonazepam (a tranquilizer belonging to benzodiazepine group) for causing somnolence and reduced reflex. In the study by Chaimowicz et al.[1], these authors reported that long half-life benzodiazepines were regularly used by 9.3% of the elderly, including other drugs that could potentially cause falls. Coutinho and Silva[4] noticed an increased risk of accidents when calcium channel-blocker drugs and benzodiazepines were used, while a reduced risk level was found with the use of diuretic drugs. The potentially protective effect of the thiazide-based diuretic drugs has been attributed to a reduced calcium excretion by urine, consequently increasing bone density. On the other hand, Cumming et al.[3] attribute the higher risk of falls to hypokalemia, arrhythmias and postural hypotension. In the studies by Moname and Avorn[7] and Tinette et al.[8], the drugs most commonly associated were benzodiazepines/ sedatives.

Rozenfeld et al.[9] found that the risk of periodic falls among sedative and anti-anxiety drugs users who have had any postural hypotension episode was 4.9 times as high as among non-users. A disagreement was found regarding the most common kind of drug used in the present study; however, our methodology was different from the others, since we haven't statistically assessed each group of drugs.

Few subjects reported the use of non-steroidal anti-inflammatory drugs, perhaps because this kind of drug is not usually prescribed for this age group. In the control group, the use of chondroitin and glycosamine were reported, but this was not found in the group with fractures. Drugs for labyrinth disorders were more commonly used in the group with fractures. In this drug class, we can highlight the most frequent adverse effects of flunarizine: sedation, weight gain, depression and Parkinsonism. Due to the higher risk of developing Parkinsonism in the elderly, this drug should be avoided in this age group [10].

The results of this study suggest that patients using drugs present higher risks of suffering fractures resulting from falls. Coutinho and Silva[4] reported the need to weight risks and benefits of prescribing drugs to the elderly, as well as to guide these individuals and their families towards how to avoid accidents.

CONCLUSIONS

The correlation of previous use of drugs and falls resulting in fractures was found to be statistically significant when compared to a control group; therefore, we can say that this constitutes a risk factor.

Drugs that change attention, motor responses and blood pressure levels deserve special attention, additionally to slippery environments, bathrooms and uneven backyards should be regarded as priorities for a safe house model for the elderly population, especially if they make regular use of drugs.

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