Hypertension as a Risk Factor for Hip Fracture

To the Editor:

Arterial hypertension is a chronic disease in which prevalence increases with age, as occurs in osteoporosis. It is clinically silent and is only revealed in the form of complications, an aspect that it also shares with osteoporosis. Various alterations of calcium metabolism have been described in association with hypertension; such alterations can cause decreased bone mass, the principal determining factor of fracture.[1,2] Another important factor is the occurrence of falls. Hypertensive patients may experience a greater number of falls resulting from fainting associated with diminished baroreflex sensitivity or hypotension secondary to therapy.[3,4] The purpose of this study was to assess the effect of hypertension and its various therapeutic alternatives on the risk of hip fracture.

After study approval by the medical institutional review board of the Rio Hortega University Hospital, a medical records search identified all patients admitted to the hospital for hip fracture from 1 January 1997 through 31 December 2001. The exclusion criteria were age <65 years and fracture related to a pathologic condition or caused by high-impact traumatic injury. The control group was obtained from the cohort Hortega.[5] Men and women between 18 and 80 years were selected from the city census. There was 3004 persons >65 years of age, 1538 women and 1466 men. Only those subjects >65 years of age and without hip fracture were included. Demographic information for the patients and control subjects, number of comorbid conditions, and medications were obtained from the medical records reviewer.

Data were collected on 996 hip fractures during the study period in patients with a mean age of 84 ± 7 years. The mean age of the control group was 76 ± 7 years (P = .0001). The study included 763 women (76%) and 203 men (24%). Hypertension was present in 444 patients in the fracture group and 1032 in the control group (RR = 1.23, 95% CI = 1.19 to 1.41). Three therapy groups accounting for 87% of all therapies were analyzed. The results, shown separately for women and men, are given in Table 1. A multivariate analysis was carried out to identify the following factors contributing to the risk of hip fracture: female sex (OR = 2.65, 95% CI = 2.2 to 3.2), age (OR = 1.13, 95% CI = 1.12 to 1.15), hypertension (OR = 1.45, 95% CI = 1.2 to 1.7). The risk of hip fracture decreased with the use of thiazides (OR = 2.4, 95% CI = 1.7 to 3.5). Hypertension was found to be a risk factor for hip fracture in hypertensive women but not in men, with thiazide use exerting a protective effect. This phenomenon was not seen in the other therapy groups (ACEIS, calcium antagonists).

Our results show that hypertension is a risk factor for hip fracture in women but not in men. Although the control group was younger than the fracture group, multivariate analysis identified hypertension as a risk factor. The pathogenesis of osteoporotic fracture is based on many factors resulting from the influence of various risk factors on two key components, namely, bone mass and falls, both potentially affected by hypertension. Various alterations of calcium metabolism have been reported in which the final result is secondary hyperparathyroidism.[1] An increase in parathyroid hormone accelerates bone turnover, decreasing bone mass and modifying bone quality, two factors that influence bone strength. Decreased bone strength is a key phenomenon observed in fractures. The fact that patients with hypertension who are treated with thiazides present greater bone mass and fewer fractures would support these data.[6] In our patients showed a protective effect with these drugs. The other two therapy groups that we assessed had the same levels of risk as before. Previously, our group had shown that angiotensin-converting enzyme inhibitors had a beneficial effect on bone mass in hypertensive women.[7] Nonetheless, this was observed in only one subgroup, specifically those patients with the DD genotype for angiotensin-converting enzyme.

The main limitation of our study was the lack of fit of the variables analyzed and the retrospective nature of the study

Table 1. Hip fracture and hypertension in women and men

	Hip fracture	Hortega control	RR	95% CI
Women				
Hypertension	365	586	1.49	1.3–1.8
Thiazides	44	124	0.69	0.5–0.9
ACEIs	205	175	2.9	2.3–3.6
Calcium antagonists	74	180	1.9	1.4–2.7
Men				
Hypertension	79	446	1.2	0.9–1.6
Thiazides	6	84	0.4	0.2–1
ACEIs	34	117	1.9	1.3–3.0
Calcium antagonists	26	122	1.4	0.9–2.1

ACEI = angiotensin-converting enzyme inhibitors.

design. This was limited by using a broad population control group taken from the same population in which the fractures occurred. An additional limitation is the relatively small number of men with hip fracture, which does not permit the role of hypertension in these patients to be determined.

In conclusion, hypertension is a risk factor for fracture, and thiazide (alone or in combination) should be added to the therapeutic regimen for osteoporotic hypertensive patients.

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